

OUTLINES

OF

PREFACE

GENERAL PATHOLOGY.

BY

GEORGE FRECKLETON, M.D., CANTAB.

FELLOW OF THE ROYAL COLLEGE OF PHYSICIANS.

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PREFACE.

HAVING for several years been engaged in lecturing upon the Principles and Practice of Physic, I experienced the want of some work, in our own language, which would present to the student the facts scattered over many older and modern writers, a knowledge of which appeared to me calculated to facilitate the study of diseases. I was thus induced to apply myself to the production of such a publication; and, if I have succeeded in its execution, I hope that it may, as it was intended, enable the student more easily to apply his previously acquired knowledge of the principles of anatomy, physiology, and chemistry, to the observation of individual diseases.

It is difficult when entering upon the study of any science, especially one requiring so much caution and judgment as the treatment of disease, to know how and what to observe, and to draw correct conclusions from the appearances presented to us. The experience of others must at first be our guide; and to offer a compendium of general principles, deduced from the best authorities, has formed my present object.

LIVERPOOL,

October, 1838.

DEFINITION.

GENERAL PATHOLOGY treats of disease generally, its nature, origin, causes, symptoms, progress and terminations. Thus, in examining the symptoms it points out, the different circumstances under which each may occur, the different causes upon which it may depend, and prepares the way to the study of particular diseases, or Special Pathology. So, also, with respect to the causes predisposing to, exciting, or modifying disease, many interesting facts are thus collected and arranged. In short, it gives a compendium of various general observations and established data, the result of the experience of many, particularly calculated to facilitate the study of individual diseases, and to form correct observers, by showing, at one general view, all the most interesting particulars connected with disease, the various forms it may assume, the manner in which we should observe them, and the mode of reasoning which we should adopt in discriminating their differences.

CONTENTS.

	Page
On Disease	13
Seat of Disease	16
Nosology	18
Causes of Disease	20
Predisposing Causes	27
Exciting Causes	37
Mode of Action of the Causes	38
Division of Diseases according to their Causes	40
Mode of Attack. Precursory Symptoms of Disease	45
Symptoms	46
Symptoms observed in the general External Appearance of the Body	49
Symptoms observed in the External Appearance of Particular Parts of the Body	54
Symptoms observed in the Motive Powers	66
Symptoms observed in the Voice and Speech	72
Symptoms observed in the Organs of Sensation	75
External Senses	78
Internal Senses	80
Digestive Organs	84
The Mouth and Tongue	86
Nausea and Vomiting	89
Respiration	95
The Circulation	109
Capillary and Venous System	121
The Blood	123
Animal Heat	124
Exhalations and Secretions	126
Absorption	134
Nutrition	136
Progress, Duration, Course, and Termination of Diseases	137
Diagnosis	143
Prognosis	147
Treatment of Disease	148

ANALYSIS OF CONTENTS.

GENERAL PATHOLOGY—DEFINITION.

FUNCTIONS.

- | | | |
|------------|-----------|--|
| 1. Vital | | { Respiration.
Circulation. |
| 2. Natural | | { Digestion.
Nutrition.
Excretion.
Secretion. |
| 3. Animal | | { Sense.
Voluntary motion. |

DISEASE.

- | | | | |
|-----------------|---|---|---|
| Dependent on | . | { | Derangement of functions.
Organic lesions. |
| Indicated by | . | { | Pain. |
| | | | Uneasy sensations. |
| | | | Preternatural |
| | | | Increased |
| | | | } Evacuations. |
| Situated on | . | { | Exterior of body—external. |
| | | | „ in |
| | | | } Interior body—internal. |
| Attacks | . | { | All textures, as inflammation. |
| | | | Particular { Serous |
| | | | textures, as { Mucous |
| | | | } Dropsy.
Hemorrhage. |
| Runs its course | . | { | In original situation. |
| | | | or |
| | | | Extends to { Leaving original situation.
other parts { Gradually diffusing itself. |

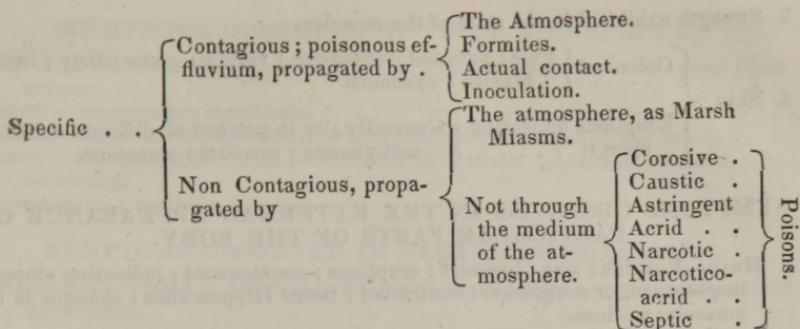
NOSOLOGY; or *Classification of Diseases.*

- | | | | |
|--------------------------------|---|---|---|
| As they resemble each other in | . | { | External characters.
Causes.
Pathological characters.
Textures affected. |
|--------------------------------|---|---|---|

CAUSES OF DISEASE.

1. *Proximate* (its application or ratio symptomatum).
2. *Remote.*

Predisposing	{	General	{	Age	{	Sanguineous.
				Temperament		Melancholic.
				Habit		Choleric.
				Occupation		Phlegmatic.
				Habitation.		
				Clothing.		
				Diet.		
				Exercise.		
				Positions of body.		
				Affections of mind.		
				Pregnancy.		
				Puerperal state.		
				Previous disease.		

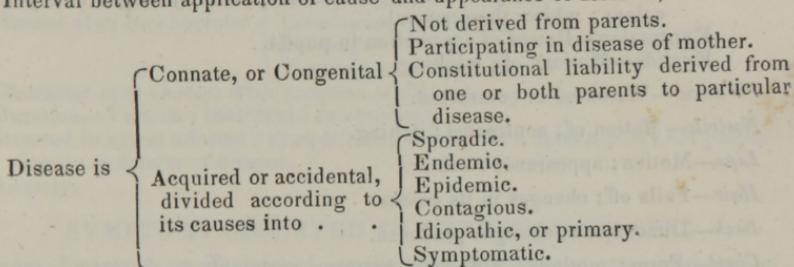


Occasional, } Predisposing, acting strongly.
or exciting } Various occasional and even slight causes.

Mode of action of causes.

Idiosyncrasy ; diathesis ; power of resisting disease.

Interval between application of cause and appearance of disease ; various.



MODE OF ATTACK ; PRECURSORY SYMPTOMS,

May consist of symptoms of { Diminution of powers and sensibility of the body
and mind.
Greater apparent vigour.
Peculiar sensations.

Occurring at various periods ; bearing no proportion to disease ; declining or increasing.

SYMPTOMS, distinction between and *Signs* ; gradually change ; not all of equal value ; occur in rapid succession, or gradually in different stages of the disease.

Essential or characteristic ; accessory.
Primary or local ; secondary or general.

SYMPATHY, causes of ; contiguous ; remote.

Ancient division of symptoms ; symptoms of disease ; of cause ; of symptoms ; supervening ; accidental symptoms.

SYMPTOMS OBSERVED IN THE GENERAL EXTERNAL APPEARANCE OF THE BODY.

1. The Attitude ; during sleep ; during action.
2. Size or volume {

{ Increased . Diminished	{ By serous infiltration, general . . Anasarca. By serous infiltration, partial . . Œdema. Accumulation of air in } Emphysema, cellular texture . . . } Accumulation of fat.
	{ Temporarily ; cold fit of ague. More permanently ; emaciation.

3. Strength exhibited in the state of the muscles.

4. Skin { Colour of { Pale; pale and transparent; yellow; green; dirty; livid;
blueish; cyanosis.
Eruptions appearing { Generally; or in patches of different colours;
upon it } ecchymoses; tumours; abrasions.

SYMPTOMS OBSERVED IN THE EXTERNAL APPEARANCE OF PARTICULAR PARTS OF THE BODY.

1. **HEAD**—Position; size; tumours; eruptions; countenance; indicating stupor; turgescence, or congestion; contracted; facies Hippocratica; changes in its muscular motions.

Colour—Redness; diffused or confined to particular parts.

Eyes—Changes of, produced by disease in them; or in the brain; or sympathetic.

Irritable; not affected even by strong impressions; convulsive motions, or strabismus; protruded; suffused conjunctiva; tinged of a yellow colour; whiter than natural.

Expression—Power of contraction in pupils.

Eyelids—Motions of; winking.

Forehead—Wrinkled or contracted.

Nostrils—Motion of; contracted; itching.

Lips—Motion; appearance; colour.

Hair—Falls off; changes in its colour.

Neck—Dimensions; changes produced.

Chest—Form; motions; difference between each side; succession; integuments.

2. **ABDOMEN**—

- Temperature; Size { Increased { By bulk of integuments.
By accumulation of gas; meteorismus.
By accumulation of fæcal matters.
By accumulation of fluids.
Diminished { By enlargement of contained viscera.
By presence of tumours.

Division of, into epigastric; umbilical; hypogastric; hypochondriac; iliac; lumbar regions; method of examining; pleximeter; auscultation.

Form of, generally or partially altered; effect of change of position; genital organs.

3. **THE LIMBS**—External appearance; colour; volume; temperature. Motions; pains; uneasiness.

Hands; fingers; nails.

SYMPTOMS OBSERVED IN MOTIVE POWERS.

Bones the passive, Muscles the active, agents of motion.

Bones—Fractured; luxated; deformed; softened, &c.

Muscular Power—Increased; diminished; lost; paralysis; hemiplegia; paraplegia; perverted; tremor; subsultus tendinum; convulsions, or spasms; general or partial; clonic or tonic; tetanus; cramp; catalepsy; chorea; contractions.

Weariness; prostration of strength; depression; debility.

SYMPTOMS OBSERVED IN VOICE AND SPEECH,

Arise from affections of organs themselves, or from sympathy with some other organs.

Aphonia; mussitatio; dumbness.

Speech, alterations of; dependent or independent of changes in the voice.

Auscultation applied to voice; pectoriloquism; perfect; imperfect; doubtful; intermittent.

Œgophonism; varies in extent.

SYMPTOMS OBSERVED IN ORGANS OF SENSATION.

SENSIBILITY—Varies in different individuals; sexes; ages; may be increased or diminished.

PAIN { Varies in the causes capable of exciting it.
 { Varies in its character.
 { Varies according to accidental circumstances.

Named after its character { Tensive.
 { Heavy or dull.
 { Lancinating; pulsating.
 { Burning.
 { Tearing; smarting; &c.

Character may change with progress of disease.

Duration—Various; remittent; intermittent.

Situated in organ affected; sympathetic, and felt in a distant part; not proportionate to danger of disease.

Anxiety.

SYMPTOMS OBSERVED IN EXTERNAL SENSES.

VISION—Increased or diminished sensibility; depravation; complete loss of sight; intolerance of light; vertigo; simplex; caliginosa.

HEARING—Too acute; perverted; tinnitus aurium; lost; deafness.

SMELL—Acute; perverted; lost.

TASTE—Depends on several conditions; modified by age; custom; depraved.

TOUCH—Confined to the hand; Tact diffused generally over the body.

SYMPTOMS OBSERVED IN INTERNAL SENSES.

Impaired; weakened; suspended; lost.

Only one or all the faculties; mental derangement, hereditary, accidental, symptomatic; delirium, mite, ferox, constant, occurring at intervals, character and causes various; delirium tremens; somnolentia; sopor or cataphora; coma vigil, somnolentum; lethargy; carus.

Sleep—Watchfulness; tranquil; protracted; varies at different ages.

Temporary suspension of functions; loss of consciousness; syncope; Lipothymia.

SYMPTOMS OBSERVED IN DIGESTIVE ORGANS.

Organs concerned in digestion—Various.

Affections—Primary; symptomatic; alternating.

Hunger and Thirst—Appetite, rarely increased, bulimia; generally diminished, anorexia; depraved, pica.

Thirst increased, depraved; hydrophobia.

Tongue moist or dry; coatings of, vary in extent, colour, tenacity, thickness; colour, whitish, yellow, brown, black, red; ulcerations; aphthæ; size; motions, tremulous, impaired, lost.

Deglutition accelerated; impeded; painful.

NAUSEA AND VOMITING—Theory of; induced by various causes; with or without pain or uneasiness; substances ejected vary, tenacious, bilious, stercoraceous, pus, blood, hæmatemesis, inodorous, acid, fetid.

ALVINE EVACUATIONS—Constipation; scybala.

Increased in frequency; in quantity; in both; state of mucous membrane; analogy between it and skin; causes of diarrhœa; tenesmus; involuntary; appearance and qualities of evacuations; solid; more or less fluid; white; dark coloured; green; bloody; purulent.

Different gases—Origin of; borborygmi; colic.

SYMPTOMS OBSERVED IN APPARATUS OF RESPIRATION.

Frequency varies in health; different individuals; sexes; ages; circumstances.

RESPIRATION—Natural; abdominal; pectoral.

Varies in 1. *Frequency*, or number of inspirations and expirations, in a given time.

2. *Quickness* with which they are performed; quick; slow; accelerated; panting.

3. *Quantity* of air inspired and expired.

4. *Difficulty* with which performed; dyspnœa; orthopnœa.

5. *Inequality*; intermittent; interrupted.

6. *Sounds* accompanying it; sobbing; stertorous.

7. *Quality* of air expired; temperature; odour.

8. *Signs* afforded by auscultation; percussion.

AUSCULTATION—Stethoscope, mode of applying; healthy respiration; gentle distinct murmur; puerile; tracheal; disappearance of respiratory murmur; râle; rhoncus, or rattle; *mucous*; dry *sonorous* (dry mucous rhoncus); *crepitating* (subcrepitating); *sibilous*, or hissing; *metallic tinkling* (tintement métallique); friction of ascent and descent (bruit de frottement ascendant et descendant).

Laughing; yawning; pandiculation; sneezing; hiccough.

Cough—Idiopathic; symptomatic; dry; guttural; humid; pain, or difficulty, or ease attending it; intensity; frequency; hooping cough; tubary cough.

Expectoration takes place with ease or difficulty; suspended; suppressed; impossible; painful.

Sputa vary; in origin; consistence; form; colour; odour; taste; composition.

CIRCULATION.

Affections—Sympathetic; idiopathic.

Auscultation—Opinions of; impulse; sound; mode of; division of precordial region into two regions; healthy state.

1. *Extent* over which the movements of the heart may be heard.

2. *Shock* or impulse given by them.

3. *Nature* and intensity of the sound.

4. *Rhythm*, or order in which the different parts contract.

Bruit; de soufflet; de scie; de râpe.

Fremissement cataire; cri du cuir.

THE PULSE—Varies in different individuals; sexes; periods of life; circumstances; natural pulse; mode of examining the pulse; true and false intermissions; pulsus fictitie debilis; signs derived from the pulse.

The pulse indicates

	<i>by</i>	<i>is called</i>
1. The <i>Strength</i> of the <i>Heart's</i> contraction	Strength	Strong.
	Weakness	Weak.
2. The <i>Quantity</i> of blood thrown out at each contraction	Fulness	Full.
	Smallness	Small.

3. The <i>Number</i> of contractions . . .	{ Frequency . . .	{ Frequent.
	{ Slowness . . .	{ Slow.
4. The <i>Regularity</i> of its action as to strength, quantity, frequency . . .	{ Regularity . . .	{ Regular.
	{ Irregularity . . .	{ Irregular.
	{ Intermission . . .	{ Intermittent.
5. The <i>Strength</i> of the action of the <i>Arteries</i>	{ Hardness . . .	{ Hard.
	{ Softness . . .	{ Soft.
	{ Redoubling . . .	{ Redoubling.
6. The <i>Irritability</i> of the vessels . . .	{ Trembling . . .	{ Tremulous.
	{ Quickness . . .	{ Quick.
	{ Regularity . . .	{ Regular.
	{ Slowness . . .	{ Slow.
7. The <i>Medium Diameter</i> of the arteries . . .	{ Dilatation . . .	{ Great.
	{ Contraction . . .	{ Small.
8. The <i>Quantity of Blood</i> in the vessels . . .	{ Oppression . . .	{ Oppressed.
	{ Smallness . . .	{ Empty.
9. The <i>Contraction</i> of the capillaries . . .	{ Obstruction . . .	{ Obstructed.
	{ Freedom . . .	{ Free.

CAPILLARY AND VENOUS SYSTEMS.

CAPILLARY SYSTEM—Secretion; exhalation; nutrition.

Its action increased, diminished; hemorrhage, passive, active.

VENOUS SYSTEM—Capacity; exceeds that of arterial; varies in different persons; at different times; course of venous blood impeded by many causes, as by pressure; its velocity; *Plethora*—1. P. ad molem; 2. P. ad spatium; 3. P. ad volumen; 4. P. ad vires; degree of strength accompanying it.

The BLOOD—Its changes; separates naturally into two parts; serum; crassamentum; their proportions vary; buffy coat; shape of coagulum.

ANIMAL HEAT—Natural standard; increased; diminished; generally; partially; regard to be had to the influence upon the pulse; burning heat; shivering; horripilatio.

EXHALATIONS AND SECRETIONS.

Definition and distinction.

CUTANEOUS EXHALATION, or PERSPIRATION, varies, in health, in different persons; insensible transpiration; deficiency; dryness of skin; sweat, general or partial, favourable, unfavourable, colliquative.

MUCOUS EXHALATIONS not easily described; changes in; coryza.

SEROUS EXHALATIONS, diminished, increased; dropsy, effect of various causes; impediment to free circulation; debility; inflammation.

SANGUINEOUS—Only one natural, and that to females, catamenia, varying in different individuals, and even in same; observations on. *Accidental*—Hemorrhages; causes; nature; active; passive; primary; symptomatic; vicarious.

PUS—Colour; smell; taste; specific gravity; composition; laudable, or true; Sanies; pus, how distinguished from mucus; muco purulent matter; exhaled on surface of membranes; diffused, or in one or more centres in organs; abscesses.

TEARS; SALIVA; PANCREATIC JUICE.

BILE—Hepatic secretion; increased; diminished; obstructed; jaundice.

URINE—Quality; quantity; mode in which passed; sediments, lateritious, furfuraceous; Prout's division; amorphous; crystallized; solid concretions; suppression, effects of.

ABSORPTION—How produced; absorbents; veins; Magendie's theory; active in favouring agents capable of producing disease; useful in carrying into circulation medicinal substances; circumstances increasing, diminishing it; removal of morbid growths or products.

NUTRITION—Excessive, defective; hypertrophy; atrophy.

ORGANS OF GENERATION.

PROGRESS, DURATION, COURSE, AND TERMINATION OF DISEASES.

Continued form; paroxysms; intermission; remission; acute; chronic; ephemeral.

Period of attack; increase; greatest intensity or acmè; decline.

Termination various; restoration to health; assume chronic form; produce some other disease; death; symptoms of each.

Crises; definition; doctrine of; critical days; reliance to be placed on crises; where most commonly observed; mucous membrane; skin; glands; cellular texture; serous membranes; regular; irregular; complete; incomplete.

Critical days; Hippocrates; indicatory; intercalary; convalescence.

Diseases; simple; complicated; Chomel's definition.

DIAGNOSIS—Definition; how formed; diagnostic signs, proper, common; pathognomic, equivocal, local, general, negative; mode of examining a patient, and cautions to be observed.

PROGNOSIS—Rules to be observed in forming.

Treatment—General observations on.

Conclusion.

OUTLINES OF PATHOLOGY.

GENERAL OBSERVATIONS.

ON DISEASE.

MAN is endowed with powers or functions requisite for the internal economy of his body, as also with others, necessary in consequence of its dependance and connexion with external and surrounding things. These exert a mutual influence upon each other, and the due performance of the one is requisite for the well-being of the other.

Three kinds of functions are described by medical writers: the *vital*, the *natural*, and the *animal*. The two first of these may be more properly classed under one head, and defined to consist in all those actions which are necessary to life, and which cannot be suspended without considerable injury to, or even the destruction of it. The vital functions include respiration and circulation; the natural, digestion, nutrition, excretion, and secretion. These latter, although necessary to life, may, however, be suspended, or impeded with much less danger than those especially named vital, and both are performed without any sense of uneasiness, and almost without consciousness. They are influenced by external circumstances, but are independent of the will.

The animal functions comprehend sense and voluntary motion. By these man is connected with the objects around him; they admit of suspension, and are dependant upon the will.

The correct and proper exercise of these several functions constitutes health. We cannot, however, say that every deviation from this state can be considered disease. The structure of the body is so complex, its actions and motions so various, that if every slight alteration constituted disease, it would be incorrect to say that perfect health could ever be enjoyed. A certain latitude must therefore be allowed, and hence it is difficult to give a correct abstract definition of disease. Of its real and essential nature, even in individual cases, we are often ignorant, and can only judge of it by its phenomena; and although attempts have been made in every age, and by every sect in medicine, to give a general definition, yet this has usually been hypothetical and partaking of the then prevailing prejudices or opinions.

Thus disease has been termed an effort of nature to throw off some morbid matter, and has been supposed to originate in some alteration of the humours of the body. Sydenham says, "Dictat ratio si quid ego hic judico, morbum, quantumlibet ejus causæ humano corpori adversentur, nihil esse aliud quam naturæ conamen materiæ morbificæ exterminationem in ægri salutem omni ope molientis." We may smile at the more ancient doctrines without yielding implicit credence to the moderns, when in our own day we find it asserted that no disease can exist, which has not its seat in some corresponding organic derangement. There exist, it is said, and there can but exist in the animal economy, organs and functions. The functions are but the organs in action, and therefore everything which is not organ, principle of organ, or effects of organ, is of no consequence to the physician. Thus if the organs are healthy their functions are healthy; and the converse is attempted to be maintained, namely, that if the functions are disturbed, there must be some corresponding derangement in the organs, or series of organs, upon which they depend. To this, in the present state of our knowledge, we cannot assent; since, in many instances, we find diseases occurring and proving fatal, and upon the most minute examination after death, we observe no apparent alteration in the structure of the organs, or we find such slight traces only, as appear inadequate to the production of the disease, and which, perhaps, we have remarked in other cases very dissimilar in their phenomena and progress. And thus we may justly conclude, that disease may arise from some derangement in the functions of the body, independent of any change in its organization, equivalent to its production, or cognisable by our senses. This is more particularly true of some affections which appear to extend their influence generally over the body, as, for instance, fever, upon which has been expended, in every age of medicine, all the ingenuity of theory. Thus it was considered by Hippocrates an effort of nature to expel something hurtful from the body, and this opinion prevailed for thirteen centuries, and was even adopted by Sydenham. By Boerhaave, it was attributed to an error loci of a too viscid blood; while Stahl conceived that it was the consequence of spasm, produced by torpor or inertness of the brain, at the extremities of the nerves, and counteracted by the vires medicatrices of the mind. Hoffman and Cullen modified and adopted this latter theory, and although many oppositions were made to their opinions, they were more generally received, perhaps, than any other. Now it is the fashion to look for its origin in certain irritations or inflamed states of the mucous membrane of the intestinal canal, or of the lungs, or in some affections of the brain and its membranes. That any or all of these states may accompany fever cannot be denied, but that all or any of them constitute the real nature of fever is at least very doubtful. In many instances, no marks of inflammation can be found in any of these organs after death. The answer from the supporters of this theory is, that they have disappeared like erysipelas. But

could so slight an inflammation, which leaves no trace of its existence, have produced so serious and fatal a general disease; and what reason have we to infer that such an inflammatory state ever existed, without some more evident proof than can be deduced from reasoning upon the symptoms? We often certainly find organic lesions in fever, but these may be considered as accessory, not essential to the disease. In an affection which produces so great general disturbance, we cannot be surprised that some organ or series of organs should become more especially the seat of disease, and that the organs so affected in preference to others, should vary in different individuals, perhaps in proportion to the peculiar constitution of each, which may render them more liable to morbid influences. If we take any of these lesions, as, for instance, the appearances produced by inflammation, or its consequences in the intestinal canal, we shall frequently find that very serious affections are shown by examination after death, which have been however, wholly unaccompanied by fever, at least by that kind of fever of which they are considered more particularly to be the cause. And yet we should naturally expect that if similar appearances, in a slighter degree, were the essential cause of fever, that here we should have had it produced in its greatest intensity. It may be argued, that the inflammation has been going on slowly and gradually, that it has existed in a subacute form; but cases may be adduced where the disease has gone on very rapidly, and in a very acute form, and yet unaccompanied by the peculiar characteristics of that state which is usually denominated fever.

Disease, in many instances, depends most undoubtedly upon organic lesion, but it depends also upon other causes, as impeded or deranged function. Thus if anything occurs to impede the healthy peristaltic action in the intestines, we have constipation, which, if not removed, may go on to the production of serious disease.

Disease may also depend upon some cause producing *pain*; and this, in some instances, is independent of any organic disease which we can trace. Pain in itself cannot be said to constitute disease. It serves to indicate it, and is thus very often useful in pointing out the real seat of the disease, or of that change upon which it depends. Thus when pain comes on suddenly, and unaccompanied by any other symptom, we suspect that it is in consequence of some affection of the nerves; when this pain is increased by putting the muscles of the part in action, we consider it to be a muscular affection, although, in this latter case, we have no decided proof of its being confined to the muscles, since both nerve and muscular fibre are essentially connected in the production of motion. In these affections, should the patient die from any other cause, we should not generally find any cognisable change in the structure of the parts which had been affected with pain.

Disease may also be indicated by *uneasy sensations*, or by *preternatural increased or diminished evacuations*, which may be considered as indicating rather than constituting disease. Thus a

variety of uneasy sensations will accompany either functional or organic disease of the abdominal viscera, which may likewise be attended by increased or diminished secretions from the organ in which it is situated, or from some other organs connected with it, in consequence of the nature of its functions. Now, while in some cases the natural evacuations of the body are merely increased or diminished in quantity, in others they are changed in their sensible qualities; and, again, in some instances, they are altered both in quantity and quality. Preternatural evacuations may also take place; evacuations which are either not common to the body, or which take place from parts from whence they do not usually proceed.

But *health* and *disease* run on as it were into each other by insensible degrees, and disease often creeps on so imperceptibly that we can scarcely define any limits between them. Upon the whole, however, we may consider disease to consist in some change or alteration in the structure and position of the organs, or in the exercise of one or more of the functions of these organs, producing an evident effect upon the accustomed health of the individual in whom they occur.

SEAT OF DISEASE.

Diseases vary in their situations. Some manifest themselves on the exterior of the body, and are thus more readily distinguished, as various eruptive diseases; others again, although not absolutely external, are yet in such situations, that we can materially assist our judgment of their nature by the touch or by the ear, assisted or unassisted by mechanical means. But by far the greatest number of those diseases which fall under the province of the physician, occupy internal parts of the body, and are thus removed from the observation of the external senses. In these cases, recourse is had to an accurate examination of the various phenomena which accompany them; and in all, where it is practicable, these should be compared with the appearances after death. And when after repeated observations it is found that a certain series of phenomena always corresponds with similar or nearly similar appearances in the same organs of the body, it may safely be concluded that when these phenomena are observed in any case, they may be considered as indicating the affection of a particular organ or series of organs, the nature of which has been ascertained by previous observation. This will not apply, however, to all cases of disease; since in many which we are enabled to alleviate by our medical means, and in those which depend upon functional derangements, and which leave no trace of their existence in any organic changes which we can detect, we can only judge of their nature by the effects of the remedies which we are induced to employ from our experience of their efficacy in cases exhibiting similar phenomena. Some diseases

attack *all* the *textures* of the body indiscriminately, as inflammation for instance, though in each of these they undergo some modification. Others again only affect *particular parts*, as dropsy, which is confined to serous membranes lining the cavities and to cellular texture. Some hemorrhages, and especially those which are periodical and vicarious, seem to have their origin more particularly in mucous membranes. Very generally a disease runs its whole course in that situation in which it originated. It may extend to other parts in its immediate vicinity and involve them in disease, and still continue its course in that in which it commenced. In other cases, it gradually diffuses itself over adjoining parts, leaving the part first affected gradually, or more suddenly, as in erysipelas, or some ulcers which go on in this way, spreading in one direction as the parts first affected cicatrize. In other cases, we find that the disease will completely disappear in the part first affected, and an affection arise in some distant and unconnected part. Thus rheumatism may at first be confined to the large joints, or even a single joint; this becomes suddenly free from all pain, heat, and redness, while uneasiness, pain, and anxiety come on in the region of the heart, accompanied by other symptoms indicating that this organ is now the seat of the disease. This change of situation is termed *metastasis*, and in some cases forms a very remarkable and important feature.

It has generally been remarked that diseases vary in their situation with the periods of life, and in the same person at different ages. The changes which take place in the external appearance of the body are apparent even to the most careless observer, but the physician recognises in these the signs of more important changes in the animal economy, which render some organs more liable to be affected than others, and thus produce particular affections at certain ages.

In infancy, the different relation in which the circulation is placed, as well as the very delicate structure of the lungs, and the great susceptibility of the skin to the impression of cold, cause a greater liability for disease to attack the respiratory organs. The liver being called into action, and possessing considerable preponderance, enables us easily to account for the affections connected with it, and so common in infants. As the nervous system begins to develop itself, the child becomes liable to affections of the brain, and to a variety of convulsive affections, which in many instances, slight causes of irritation may bring on rapidly. In youth the respiratory organs predominate, and hence we have a variety of affections in these. The change which takes place in the voice at the age of puberty in males, renders the organs concerned in its production more especially liable to be affected; while, in females, the great changes which are going on in the uterine system often prove the fruitful source of a variety of diseases. The adult is perhaps least liable to be affected by any particular disease. He may be considered as having all his organs duly balanced, without a preponderance

of action in any particular part; if any does exist, it appears more readily to occupy the abdominal viscera, for at this period most commonly the different structural diseases of these organs, as of the stomach, liver, &c., commence. In old age, the affections of the abdominal viscera continue to predominate, with the addition of those of the bladder and uterus. Important changes now commence, the organs begin to deteriorate, the nervous system becomes more inert, and a variety of affections are produced by these changes. The great accumulation of the calcareous phosphate becomes also a source of disease; thus affections of the heart, its valves and coronary artery, of the aorta, and, as a consequence of these, of the lungs, are produced. In the decline of life, too, at any time between fifty and seventy-five years of age, frequently a remarkable alteration takes place, which Sir H. Hallford, in his elegant and interesting paper upon this subject, considers a disease rather than a mere declension of strength and decay of the natural powers, since persons frequently rally from the languid and feeble condition of the system into which this change had thrown them. "It appears to me," he says, "to have the signs of a marked and particular disease, and I would describe it as a falling away of the flesh in the decline of life, without any obvious source of exhaustion, accompanied with a quicker pulse than natural, and an extraordinary alteration in the expression of the countenance."—*Trans. of the College*, vol. iv., p. 318.

The different seasons of the year are also considered to exert an influence over the seat of diseases. Thus affections of the chest predominate in winter, while in autumn and the close of summer, diseases in the intestinal canal, or abdominal viscera, are observed to prevail.

NOSOLOGY.

The advantages resulting from the classification of different natural objects seem obviously to have excited an attempt to arrange and classify diseases. "Primo expedit," says Sydenham, "ut omnes morbi ad definitas et certas species, revocentur eâdem prorsus diligentia quâ id factum videmus a Botanicis Scriptoribus in suis Phytologiis;" and he further remarks, "Nam ut demus aliquid varietatis a temperamento individuorum et tractandi ratione proficisci, nihilo minus adeo æquabilis ac sibi ubique similis est naturæ ordo in producendis morbis, ut in diversis corporibus eâdem plerumque reperiantur ejusdem morbi symptomata, ac illa ipsa quæ in Socrate ægrotante observata fuerint etiam generaliter ad hominem quemcumque eodem morbo laborantem transferri possint. Non secus ac universales plantarum notæ ad omnia cujusque speciei individua rite se diffundunt." The first attempt at a classification seems to have been made by Felix Plater, and then the several systems of Nosology of Sauvages, Linnæus, Vogel, Sagar, Cullen, and Macbride, &c. successively followed.

But the difficulties attendant upon the arrangement of diseases in a systematic form are considerable. In the first place, a correct definition of each is requisite, and this should include a brief history of the disease, as regards its progress and all those essential symptoms which enable us to discriminate this particular disease from others which resemble it, or might be confounded with it. At the same time, it should be free from all theory, and to great perspicuity should unite brevity. Dr. Cullen remarks, "that the fault of many able physicians has been to give a too detailed and minute history of diseases. They have not only given the symptoms which are always present and inseparable from the disease, but they have enumerated all which by any chance have been observed to accompany the disease, and have neglected to point out, in their anxiety to give a full history of the disease, those symptoms which are essential to it, and which distinguish it from others." In some diseases, perhaps, we can scarcely avoid including in our definition some of the symptoms which occur in the varieties. Diseases, after being correctly defined, may be arranged in different classes, orders, and genera, either according as they resemble each other in their external characters, or in the similarity of their causes, or in their pathological characters, or according to the textures which they occupy. In this manner a system of nosology is formed; a classification, in fact, of diseases, according to their affinities, each disease being defined in as short and correct a manner as possible, so that we are enabled by this definition to recognize, and readily distinguish it from others.

The number of diseases to which man is liable, is very great, and this number would be considerably multiplied if we should consider all the varieties of each as so many distinct diseases. Some are readily recognised by their external characters, and some by the specific causes exciting them; whereas others, which do not exhibit any material change in the organs, or only a variety of lesions differing in different cases, and which appear to arise from no single specific cause, cannot be referred to any particular genus, but must be estimated only by their symptoms. In every disease, too, great variety is observed; each has not constantly the same symptoms, the same progress, the same duration or tendency to a favourable or unfavourable termination. The small-pox exhibits a peculiar eruption, but how various are its general symptoms; at one time it may be a mild disease, the pustules few in number and distinct, and the general disturbance but slight; while, in another member of the same family and from the same contagion, the disease may assume the most formidable aspect, the body be one almost uniform mass of pustules, and the accompanying constitutional disturbance alarmingly violent. We must be acquainted, then, with each variety, and with the numerous intermediate forms. Among the different modifications of diseases, a distinction has been made between the most important and those which are less so; the former of these are called *species*, and the latter *varieties*, though we have no fixed

rule for establishing this distinction as in Zoology or Botany, and, consequently, every nosological writer varies.

The arrangement of the different productions of nature, either in the animal, vegetable, or mineral kingdoms, is by no means a simple task, nor is it always easy to draw a strict line of demarcation between the animal and vegetable kingdoms, the lowest in the scale of animal life, appearing to possess as slight or even slighter claims to be considered as animal than certain vegetables. The external characters of minerals, too, would often mislead; and chemical analysis of their component parts, in both cases, would seem alone to afford any correct basis for their arrangement: still it is necessary to be acquainted with the external characters of a mineral, in order that we may recognise it when we meet with it. It is the same with diseases; we should be able to discriminate them by their external characters or *symptoms*, but at the same time, to carry on our parallel, we should be able to analyze them and to comprehend their essential character, or the morbid action or change upon which they depend; otherwise, our attempts to cure might be productive of more injury than benefit.

It has been observed by some modern writers, that since all diseases consist in alterations of texture, pathological anatomy can alone develop their true character, and form the correct basis for their classification. It has been already stated, that this opinion, with respect to some diseases, would appear to be untenable, and as we find a great variety of alterations occurring in the textures, many of which do not admit (so far as we know at present) of being distinguished by any peculiar symptoms during life, therefore all these lesions of a particular organ or texture, unless they admit of being thus distinguished, must in the present state of our knowledge be looked upon as the effects of the same disease, else we should have almost an infinite number of diseases. A particular disease in different stages of its progress is marked by different alterations of structure, but these must not be considered as so many different, but the same disease. It is to the knowledge, therefore, of these first changes that we should endeavour to arrive; for they are the groundwork of the others, the first elements of the other changes, and if the result of our pathological researches were sufficiently accurate, upon these our classification should be founded. To the labours of the modern pathologists we are greatly indebted, for their researches have in many instances given a much more accurate knowledge of diseases, and led to a more guarded and more judicious practice; but we may still withhold our concurrence in many of their deductions, until they are supported by stronger evidence, and were fully established by experience.

CAUSES OF DISEASE.

As every disease may be considered as some *alteration* in the functions, or in the organic structure of the body, it is an effect

which must have originated in some cause; and hence the causes capable of inducing disease have always deservedly engaged attention. They are very numerous, and their influence is in constant operation. They may exist in the body itself, or may be external to it, and even those *agents*, which are essential to life, may by error or abuse become fruitful sources of disease.

The *causes* of disease have been divided into the *proximate* and *remote*, and these latter into the *predisposing* and *occasional* causes.

The *proximate* cause has been defined, "illa quæ præsens morbum facit, sublata tollit, mutata mutat;" in short, it is the disease itself, and must vary, of course, in every disease, and even in the same disease during its progress. For as one disease is made up of different stages or changes in its symptoms, these, in most instances, are the effect of some change in the cause upon which the disease essentially depends, or in the succession of morbid actions which constitutes the real nature of the disease. Gaubius observes, "In as many different parts, therefore, as that which we call disease consists, so many different conditions or active powers will be the causes of it, every one of which makes some part of the disease, united the whole." How can we, in fact, apply the term cause to that which must be considered an effect, for the proximate cause is nothing more than the effect produced by the action of those causes which have excited the disease. The application of the proximate cause to the explanation of the symptoms, is called by medical writers, the *Ratio Symptomatum*.

The *remote causes* comprehend a variety of agents, varying much in their nature and in their effects. Some act generally, and produce in different, or even in the same individual at different times, dissimilar diseases. Thus one may be exposed to the influence of cold, and have fever produced; while another, or even the same person at another time, may have pleurisy, or sore throat, arising from exposure to the same cause. Others of these causes always produce, in those who are exposed to their action, the same disease, and these may be termed *specific*. Again, it is remarked, that a set of causes may go on gradually operating, and disposing the system to be excited to disease upon the application of any of those causes, which may assail the body from time to time, and these are named *predisposing* causes. So that we have specific, predisposing, and occasional causes.

The *specific* causes admit of being divided into those which produce diseases capable of being propagated by *contagion*, and into those which produce diseases which are *not contagious*. The former of these give origin to a particular series of symptoms, which may be transmitted to any individual, or series of individuals, who come in contact with the person affected. And these may again be divided into those which require *absolute contact* for their diffusion, and those which may be transmitted through the medium of the *atmosphere*. This also applies even to those specific causes which are unconnected with contagion. For we know that many of these

act through the medium of the atmosphere, and produce diseases which are not contagious,—as a variety of effluvia or emanations, and of irrespirable gases, which prove destructive of life by their action on the respiratory organs. The most remarkable instance is the marshy miasm, or vapours arising from marshes, which are capable of producing fevers, marked by the singular feature of regular intermissions between the periods of the paroxysms, and hence called intermittent fevers. It has been attempted to disprove the existence of any such specific cause, and argued that any one exposed to its influence may equally suffer from a continued affection, or one characterised by no such intermissions, and which may prove fatal in a short space of time. The specific cause of intermittents would, indeed, appear not to arise solely from the effluvia of marshes, but is said to proceed also from decaying animal and vegetable matter, from great heat accompanied by moisture; and the observations of M. Andral tend to prove that intermittents may originate, in similar causes, with continued fevers. The opinions of most writers are, however, opposed to this, and a variety of facts are adduced to show that the presence of decaying vegetable or animal matter is necessary to the formation of marsh miasm.*

The operation of the different poisons may be taken as an instance where causes act specifically in the production of a non-contagious affection, and not through the medium of the air. Thus Orfila arranges them under specific heads, according to their action. As *Corrosive*, or those which produce in the intestinal canal the same effects as caustic on the skin, more serious of course in their consequences, as the parts acted upon are of greater importance in the animal economy,—as arsenical, mercurial, and antimonial preparations, concentrated acids, &c. *Astringent*, which produce a diminution in the intestines, a narrowing or obliteration of their canal, or, at all events, obstinate constipation,—as lead, wines impregnated with lead, or food cooked in leaden vessels. The *Acrid* act nearly in a similar manner with the corrosive, except that, although they inflame the textures, they do not directly occasion eschar,—as chlorine, the colchicum autumnale, colocynth, elaterium, &c. The *Narcotic* act little upon the organs with which they are in contact, their operation being upon the brain, whose functions they disturb or suspend,—as opium, hyoscyamus, prussic acid, nitrogen gas, &c. Another class, which produces the effects both of the narcotic and acrid, he terms the *Narcotico-acrid*, as tobacco, stramonium, nux vomica, cocculus indicus, &c.; while he denominates those *Septic* which bring on gangrene in different parts, or which induce fevers of a low character which prove generally fatal,—as sulphuretted hydrogen gas, putrefied substances, the sting or bite of bees, wasps, vipers, venomous snakes, &c.

* M. Magendie states that a quantity of this deleterious atmosphere, or miasmatic exhalation, has been collected, and in a few hours, by the assistance of cold and other agents, has been condensed, and a considerable residuum of animal or vegetable matter obtained, which had a tendency to run into putrefaction with the greatest rapidity.

Contagion.—Of the real and essential nature of contagion we are ignorant, but with its laws, general phenomena, and existence we are better acquainted. It may operate in three several ways: 1st, through the medium of the *atmosphere*; 2dly, through the intervention of substances which have been near the bodies of those affected, and which are called *Fomites*: and 3dly, by actual contact or *inoculation*.

The noxious effluvium, or matter produced by the bodies of persons affected by contagious diseases, and which propagates them from one individual to another, may either be something visible and substantial, as that formed in the pustules of small-pox, or the vesicles of cow-pox; or it may be something invisible, of which the existence is only known by the effects which it produces, as in hooping-cough, scarlet fever, &c. That such a principle does exist we infer from the circumstance, that those who have been exposed to intercourse with persons affected are liable to be themselves similarly affected, and this liability is increased in proportion to the proximity and frequency of their approach; and, again, those persons who avoid any such intercourse escape the disease entirely.* In some diseases the matter may be introduced by inoculation. If, then, we could apply inoculation in every instance, and thus produce the disease, we should require no further proof. This, however, in many instances is impossible, as in hooping-cough, yet this disease cannot be denied to be contagious on that account. Even by those who deny the contagious nature of some diseases, it is readily granted to others, as to scarlet fever and hooping-cough; yet in these diseases the proof alluded to is impossible, so that in the consideration of contagion we may discard it, and adduce proofs of the other two assumptions.

We know, certainly, that many who are exposed to the influence of contagion may yet escape its effects, but this by no means disproves its existence, or its capability of producing powerful effects. If we reason so, we might say that exposure to cold or moisture will not produce disease, because some have been exposed to their action and have escaped. The late Dr. Odier, of Geneva, in a letter to Dr. Haygarth, says, “We have frequently inoculated at Geneva a great number of children, in the years during which the small-pox was not epidemic; these children have gone out every day, even after the eruption had broken out, they have been in the streets and public walks, and have communicated freely with other children susceptible of the infection; and not only the small-pox did not spread, but there did not occur, to my knowledge, any distinct instance of the communication of the disease from one individual to another, in the streets or promenades.” Dr. Huxham states that he

* M. Magendie states, that the vapour surrounding the beds of patients labouring under typhus, may be submitted to the same experiments as the miasmatic exhalations, and that it may be condensed by the action of cold into a liquid charged with animal matter of a highly putrid nature, and much more injurious than that procured from the exhalation of marshes.

knew an old nurse and an apothecary, who for many years attended a great number of patients in small-pox, and yet they never had the disease. But surely from cases similar to these, although they might even occur more frequently, we should not say that small-pox was not contagious, if we found, in the very great majority of cases, that persons exposed to its influence suffered from its effects.

It is remarkable in contagious diseases, that a person may at one time completely escape and resist their influence, who at some future period readily suffers from it. Van Swieten and others speak of old men who have never suffered from the contagion until they had arrived at a very advanced period of life, and who had yet communicated freely in their youth with persons affected with small-pox: and Foderè remarks, "I have seen children and adults, in whom inoculation had been tried several times, but in vain, and who had also been vaccinated three several times, who yet during a variolous epidemic have caught the infection."

Among the many instances which might be adduced in proof of the influence which contagion exerts over persons exposed to its action, and the consequent communication of disease, it is difficult to select any particular case, since each has its peculiar value and interest; and I, therefore, prefer referring, without noticing the older authorities, to the works of Sir A. B. Falkner and Mr. Tully on the Plague; to Dr. Mac Michael's Observations on Contagion, and to an able paper by Dr. Gooch, appended to his work on the Diseases of Females, of which I have not hesitated to avail myself. It has, however, been maintained that the many instances which may be adduced from the plagues of Moscow, of Egypt, of London, &c., do not establish the doctrine of contagion in diseases, like the plague or typhus fever; that contagious diseases are uniform in their symptoms and duration, that they generally only affect a person once during his life, that the patient is not liable to relapses, and that they may be propagated at all times and all seasons. Whereas, in such a disease as the plague, it breaks out at a certain season, lasts for a certain time, and then subsides and lies dormant till the favourable season returns. But do not diseases, avowedly contagious, disappear and become again more prevalent at certain seasons? The scarlet fever, says Sydenham, though it may happen at any time, yet it most commonly appears at the latter end of summer; and, in his description of the mode in which small-pox appeared, he states that it began to show itself in the vernal equinox, spreading more and more every day, becoming epidemic about autumn, abating on the coming of winter, returning again in the following spring, and prevailing until checked by the subsequent winter. Boerhaave, in speaking of variolæ (1380), says, "*Est ut plurimum epidemicus, verno tempore primo incipiens, æstate crescens, languens autumnò, hyeme sequente fere cedens, vere iterum eodem ordine rediturus. Quo citius in hyeme incipit, eo violentior, quo serius, eo mitior erit mali natura. Hinc liquet quo anni tempore periculosior.*" And Van Swieten, commenting on

this aphorism, fully agrees in it, and cites the authority of Sydenham. It is also asserted by these great authorities, who saw small-pox before inoculation was introduced, when it was in its natural form, and armed with formidable powers, that the towns were occasionally exempt for several years from any great epidemic small-pox, although the disease did not cease to exist altogether, since individual cases occasionally occurred. Van Swieten states, that he has sometimes observed a city to be entirely free from it, while in the neighbouring villages it was epidemic; and again, the city to be similarly affected, while the villages remained healthy, and yet a free and constant communication existed between them. The plague at Seyde, and other villages in Syria, is said to appear every thirteen years. In many provinces it only appears at certain seasons of the year, and in some instances, where the cities were infected, the peasants of the neighbouring villages have brought in provisions, and yet have not carried any infection home. From these and similar instances, many eminent men have been induced to suppose that, besides contagion, it is necessary that some predisposing causes should co-operate, for the production or propagation of contagious diseases.

The strongest arguments adduced against contagion in the plague appear to be, that the disease is not propagated from person to person, but that it originates in some particular state of the atmosphere, which affects a healthy person coming into an affected district. Many facts might be brought forward to disprove this; and, indeed, many modern observers even maintain that absolute contact with the infected persons, or clothes, is essentially necessary for the communication of the disease. In all the histories, we find most striking instances where complete seclusion has secured the parties from attack, even when the disease was raging around them, and when, of course, they were exposed to the influence of the same atmosphere. Persons, too, who have gone from infected districts to healthy parts of the country, have carried the disease with them, and have thus been the means of extending it to places which would otherwise have escaped. Another argument is that the plague sometimes suddenly abates, even when we should expect the supposed sources of contagion to be most abundant, and that under any circumstances persons may be exposed to them and yet not suffer from the disease. But this, upon examination, will be found applicable also to other diseases, the contagious nature of which is not denied, especially from attention to the histories of small-pox, as it existed before the introduction of inoculation.

It may be asked whether a contagious disease can arise accidentally, independent of any contagion, and whether a disease not naturally contagious can become so during its progress. Pringle states, that a dysentery may arise from an evident cause and then become contagious. Foderè relates a case, where two deserters arrived at a village near Marseilles, after escaping from the prisons at Aix. One of them was lodged in a cave at the bottom of a

ruin, where the air could only be admitted through a small door. He became ill, and fourteen charitable persons bestowed their care upon him for twenty-one days, when he died. All these persons were attacked with disease, and of these eight died. He also gives a very interesting account of an eruptive fever, which occurred at Martigues, in 1807, and which, although at first only sporadic, became at last contagious.

M. Magendie remarks, that wherever people are assembled together in large numbers in confined situations, we may have a fever originated which is capable of being transmitted to healthy individuals; but that experience proves, that the same individuals, when separated, will not give the disease. A person may go into a locality or habitation where typhus fever already exists, and immediately he is affected with this complaint; but if the same individual be removed from the hospital in which numbers of patients, affected with the same malady, are crowded together, where the air is tainted with every kind of unhealthy exhalation, and is transported to some airy, wholesome situation, he is incapable of communicating the disease,—for in M. Magendie's opinion we never see the disease propagated by persons affected individually.

I have gone into some detail upon the subject of contagion in the plague, because its existence is by some very strenuously denied; and this doctrine deduced from reasoning upon it, is extended to other diseases prevalent in our own country, and appearing to arise, or having arisen from other causes, to be propagated by contagion. But to me it seems well established, by the observations of most competent authorities, that a specific cause exists in some diseases, which is capable of exciting a similar disease in persons exposed to its influence, who again become the medium of transmitting it to others; and this may go on for an indefinite time, and its influence may be extended over an indefinite number of persons. Among these diseases so arising, some seem to diminish, if not altogether to destroy, the susceptibility in those who have once laboured under them, of being again similarly affected, as in the eruptive fevers and hooping cough. In others, this susceptibility is only weakened or exhausted for a certain time, while in others it seems to be increased, instead of diminished. It has been supposed, that in some instances the contagious influence only exists for a certain period, while in others it extends through the whole course of the disease. But it would appear impossible to define accurately at what period the danger from infection ceases, since so much must depend upon accidental circumstances. Equally uncertain, too, must be any speculations upon the distance at which the contagious virus may operate. A great difference naturally exists between different portions of air, in proportion as this air is confined in a smaller or larger space, or as there may be one or more centres from whence contagion may emanate. A single person confined in a small room may render the air unpleasant to another entering it, while a whole army might bivouac without producing such an effect.

The influence of contagion operates, directly or indirectly, by actual contact, or through the medium of some other person or thing, and in some instances where the person so conveying it is not himself affected by it. This may happen in diseases to which he is liable, as fever, as well as in others to which he is not liable, or which are not received except in particular conditions, as in puerperal fever, where the male practitioner, or a female who is not liable to be affected, may carry the disease to many lying-in-women in succession. In some cases, where absolute contact takes place, it appears requisite that some abrasion, or an extreme tenuity of the epidermis should exist, in order that the disease may be communicated. It has also been remarked, that some articles, as woollen, cotton, and the garments which have actually been in contact with infected persons, most readily transmit the disease, and even produce it in greater intensity. This is particularly noticed by several writers upon the plague, and by those who have lived in the Levant, who relate many singular cases where the infection had remained for years attached to porous substances. Benza states, that some cords, which had been used for the conveyance of persons ill, or dead from the plague, were found after twenty years, in a place where they had been forgotten, and were used for a bell, but that they caused the death of the person who found them, which was followed by that of 10,000 citizens of Vienna. A. D. 1712.

Dr. Hildenbrand relates, (in the *Dict. de Méd.*, vol. xix., p. 156,) that he carried the infection of scarlatina in a coat which had not been worn since his attendance on a scarlatina patient, a year and a half before, from Vienna to Podolia, where the disease had till then been almost unknown. From experiments made by the late celebrated chemist, Dr. W. Henry, on the disinfecting powers of increased temperatures, and published in the *Phil. Mag. and Annals*, Nov. 1831, and Jan. 1832, several interesting results were obtained, and especially worthy the attention of our legislature, as affecting an amendment of our quarantine laws, so ineffectual and oppressive in their present state. Dr. Henry considers it proved that by exposure to a temperature not below 200° Fahr., during at least one hour, the contagious matter of scarlatina is either dissipated or destroyed; and that flannel waistcoats, taken from the persons of scarlatina patients, may and have been worn, by persons liable to the disease, with impunity, after having been so exposed to heat.

Many causes seem to influence contagion, and render people more or less liable to be affected by it; but these may be more properly spoken of under the next division.

PREDISPOSING CAUSES.

These render the body liable to be affected by disease, on the application of any cause capable of exciting it, and to which the body may be accidentally exposed. Some of the predisposing

causes act at one and the same time upon many individuals, and thus render them liable to be affected by similar diseases, while others appear confined to single individuals; and thus they are divided into *general* and *individual*, or particular predispositions. Under the former of these may be enumerated *climate*, the *seasons*, and *local situation*, &c. Thus a residence in hot climates predisposes to a particular class of affections, in which the hepatic system seems peculiarly liable to be affected, very warm states of the air being supposed to impede the changes which the blood undergoes in the lungs, and by thus furnishing abundant materials for the formation of bile, occasion an increased secretion of this fluid; whereas, in the colder climates, the more general affections are inflammatory, and especially those which affect the respiratory organs. Thus, too, we generally find a very different class of diseases prevailing in the autumn from those which are observed in the spring. Nor can we doubt that the situations in which men live, in crowded cities, or in the much less populous and retired villages, inhaling the pure and untainted air of the country, or crowded into a narrow court or alley, must give them a predisposition to be dissimilarly affected by disease. That causes, in fact, which might act upon one to the production of very serious, might in the other be productive of only slight affections, or pass innocuously by. Wentworth, in his description of the colony of New South Wales, 1819, states that there are no infantile diseases whatever in New Holland, the measles, hooping-cough, and small-pox are entirely unknown. Some few years before the foundation of this colony, the small-pox committed the most dreadful ravages among the aborigines. It appeared to have been introduced by Captain Cook.

A very important class of predisposing causes, however, operate only on the individual. Some of these may go on for a long period unremarked and exciting no alarm, until upon the accidental application of some exciting cause, they are brought into fuller operation, and modify its action by giving a particular tone or character to the disease produced. These operate in rendering one person more liable to be affected by some one form of disease than by another; they give a greater facility to the production of the disease, and a particular character to it. Thus two persons, differently predisposed, may be subjected to the operation of the same exciting cause, as exposure to cold. In the one simple catarrh or some other inflammatory affection may be produced, and readily yield to the appropriate remedies, and the patient regain his former health; in the other pulmonary consumption may be the result, and terminate in death. A party may indulge freely in the pleasures of the table, commit great excesses in eating and drinking, and all may escape unhurt but one, who is seized with apoplexy and dies. In these cases it is said that a predisposition existed to these particular forms of disease. This predisposition to disease may be hereditary, or inherited by the child from one or both of

his parents. There may also be a natural predisposition to particular diseases independent of this, or it may be acquired by several means, as mode of life, &c.

Hereditary Predisposition.—Much has been said in order to disprove the existence of hereditary diseases, and in some degree with justice, if it is meant to be asserted that children may be born absolutely labouring under the disease to which their parents are liable, or having the actual germs of it in their constitution. We must, however, admit that a child may be born with a conformation of body similar to its parents, and that a peculiar form or feature may be transmitted through many generations. And what reason have we to deny that a peculiarity of conformation, successively transmitted, may give the predisposition to be affected by diseases similar to those under which the parents have suffered?

“Native or congenital peculiarities of form, like those of colour, are transmitted by generation. Hence we see a general similitude in persons of the same blood, and can distinguish one brother by his resemblance to another, or know a son by his likeness to his father or mother, or even to the grandfather or grandmother. All individuals of the same family are characterized by particular lines of countenance, and we frequently observe a particular feature continued in a family for many generations. The thick lip, introduced into the imperial house of Austria by the marriage of the Emperor Maximilian with Mary of Burgundy, is visible in their descendants to this day, after a lapse of three centuries. Haller observes that his own family had been distinguished by tallness of stature for three generations, without excepting one, out of numerous grandsons descended from one grandfather.”—LAWRENCE’S *Lectures on Man*, 448 (1819).

“On voit,” says Montaigne, “escouler des pères aux enfans non seulement les marques du corps mais encore une ressemblance d’humeurs de complexions et d’inclinations de l’ame.”

Families have been observed having six fingers or six toes, and these have been transmitted to their descendants. A case of this kind is recorded in the *Philosophical Transactions* (1814), Part I., in which the supernumerary toes and fingers could be traced in the family for four generations. They were introduced by a female who had six fingers on each hand, and six toes on each foot. From her intermarriage with a man naturally formed were produced ten children, with a supernumerary member on each limb, and an eleventh, in whom the peculiarity existed in both feet and one hand, the other hand being naturally formed. This latter married a man of the ordinary formation, and had four children, of which three had one or two limbs natural, and the others with the supernumerary parts, while the fourth child had six fingers on each hand, and six toes on each foot. He married a woman naturally formed, and had eight children, four with the usual structure, and the same number with supernumerary fingers or toes. Two of

these were twins, of which one was naturally formed, and the other six-fingered and six-toed.

Numerous examples might be cited to show that various defects or peculiarities in the external conformation are capable of being thus transmitted; of these the porcupine family, as it was called, forms a remarkable one. In some families the chest is broad, open, and expanded, in others it is narrow and contracted. In some the children are round-shouldered or short-necked. Some again are remarkable for very large feet or hands, while others are equally noticed for their smallness. Portal mentions several instances, but he does not confine his observations merely to external peculiarities. Indeed we often see children affected with various diseases of the nervous system, as epilepsy, convulsive affections, mania, whose parents have previously suffered from these diseases. Do we not also see gout, tubercular phthisis, scrofula, and other affections transmitted in a similar way? Mead says, when speaking of scrofula, "*Eo autem terribilius est hoc malum, quod a parentibus in prolem sæpe transit, et hæreditate quam cepit haud facile se privari sinit.*" Foderè relates cases where an aneurismatic predisposition appeared to exist, and when speaking of the exemption which some persons seem to have from small-pox, he observes, "Among many examples which I have collected at Marseilles, I have always one before me in my wife and her family. Her father, who died at the age of ninety-one years, after a long practice, never had small-pox, and he tried in vain to give it to my wife by inoculation, and by permitting her to play with children affected by it. His father and grandfather, who both died at more than eighty years of age, were also similarly situated, and had never had small-pox; and he related to me many analogous facts."

Admitting the fact of hereditary predisposition, we observe several remarkable circumstances connected with it. The children may suffer from the disease under which one or both of their parents have laboured. But in some instances we find that one generation is passed over, and the grandchildren are alone affected; and yet these again may have children who suffer similarly to themselves and their grandfathers. In some cases only certain of the children are affected, and Cullen thinks that those are most liable who most resemble their parents, while in others we find one part of them suffering from one set of symptoms, and the remainder from another. A great connexion exists between affections of the stomach and urinary organs and the gout, and thus in the descendants from gouty ancestors, very often the males are affected with true gout, while the females have either the affections of the stomach or urinary organs. In many instances, perhaps, we may in some degree account for the exemption of the children from hereditary disease, by the supposition that it might be so eradicated or weakened in consequence of the parent having formed a marriage with one descended from a healthy stock, that the children might be altogether free or only slightly predisposed to the disease, and by

their intermarriage again with healthy individuals, all traces of it might be lost in their descendants. A very contrary effect might however be produced by their alliance with a branch of a sickly and debilitated family, the offspring of which would probably suffer as much or more than their progenitors.

But supposing that children spring from healthy parents and enjoy good health and apparently full and perfect use of all their organs and functions; yet, exposed as they are to a variety of circumstances capable of disturbing this harmony, may not some accidental cause produce disease in them, which they may transmit to their children. Foderè relates a case where a grandfather neither suffered from stone or gravel, nor indeed had any of his ancestors, but two of his sons died from stone, and all their children from an early age were affected with it. They seemed to have acquired the disease by their diet and mode of life, since the children of three other sons and a daughter whose habits were different were not so affected. It may be remarked that any defects of the body, mutilation for instance, are not thus transmitted; a man may lose an eye or a limb, yet his children will not be born either blind or maimed.

The hereditary predisposition does not generally show itself by the appearance of any disease until a certain time, and this period varies according to the peculiar morbid constitution or predisposition inherited, the causes to which the individual may be exposed, and the nature of the resulting malady. This is not, however, always the case, for generally scrofula hydrocephalus, and convulsive affections appear at an early age, consumption frequently at the most hopeful period of life, gout generally comes later when the digestive organs predominate, and later again come apoplexy and the organic affections of the abdominal viscera. In females we observe this particularly to be the case in some affections of the uterus, which in most instances come on at the decline of life.

Independent, however, of any hereditary predisposition, a variety of causes may operate upon individuals, and produce in them a liability to be affected by particular diseases. Some of these appear to originate in and be confined to the individual, while others arise from causes which may equally affect every one subjected to their influence. Thus the different periods of life appear to exert an influence in predisposing to disease, and as we have remarked that disease often varies in its seat according to the age of the individual, so we may say that particular diseases seem to be similarly influenced in the period of their making their appearance. Generally speaking, independent of the organs peculiar to each sex, which render them liable to some affections not common to both, it may be remarked, that any difference which exists in the generality of diseases to which both sexes are liable, is due rather to their different habits and modes of life, than any other peculiarity. In a fever or inflammation both may suffer similarly, especially if the female be a robust inhabitant of the country.

The ancients imagined that they could establish periods occurring at the expiration of a certain number of years, at which a total change in the body had been completed, and at which an analogous change took place in the constitution. These periods were supposed to take place at the end of seven, nine, or three years, according to the fancy of the different theorists; but are now disregarded. The doctrine of *Temperaments* is entitled to more attention; since these appear to operate in imparting predispositions to particular affections, and in modifying others by predisposing to the occurrence of particular symptoms. We generally admit that a peculiar constitution gives a greater facility to resist or fall into disease, and that a man of strong constitution, robust, healthy, and capable of strong bodily or mental exertion, when he is affected with disease, will most probably labour under acute and especially inflammatory affections; while the ailments of a weak and debilitated person who is almost constantly suffering from slight causes, have frequently no decided or marked characters. A particular conformation of the body would seem to dispose to disease, and thus we recognise in a corpulent, short-necked man a disposition to apoplexy. "*Obesi plerumque acutis morbis,*" says Celsus, "*et difficultate spirandi strangulantur, subitoque sæpe moriuntur.*" Independent, however, of the peculiar constitution just stated of each individual, we observe certain general characters indicating a peculiarity of constitution and which are not confined to any particular individual, but are found, as it were, dividing men of the same nation into certain classes. These are designated *Temperaments*; and of these, four principal varieties have been described by the older writers: the sanguineous, the melancholic, the choleric, and the phlegmatic, which again admit of various combinations and modifications. They were erroneously attributed, as their names imply, to the predominance of one or more of the different humours of the body. They are now by some considered to depend upon the difference existing in the proportions and balance of the different organs composing the body, as well as the different degrees of energy with which the functions of these organs are exerted. "The predominance of one or other system of organs," says Richerand, "modifies all the economy, impresses striking differences on the results of the organization, and has no less influence upon the moral and intellectual than upon the physical faculties. This predominance establishes the *Temperament*, it is the cause of it, and constitutes its very essence." He enumerates four varieties; the sanguine, the bilious, the lymphatic, and the nervous. If the heart and sanguiferous system enjoy a predominant activity, the pulse will be quick, frequent, and regular, the complexion rosy, the countenance animated, the stature good, the form soft but well expressed, and the muscles of a due consistence and moderately plump. The nervous susceptibility is easily affected, the mind rapidly passes from object to object, the conception is quick, the memory good, and the imagination vivid. Persons of this character are generally fond of social pleasures and

enjoy good health. Their diseases will chiefly be inflammatory or connected with plethora, having their seat in the circulating system, and requiring depletion. This forms his description of the sanguine temperament; and for its perfect existence, the lymphatic system, by a moderate development, should coincide in energy with the sanguiferous, so that an exact balance should exist between them.

The bilious temperament admits of several sub-varieties, and is generally divided into the bilious and atrabilious or melancholy temperaments. Stahl says that in this temperament the arteries and veins have a larger calibre, and the quantity of the blood appears to be much more considerable than in the sanguine. The skin is of a brownish colour approaching to yellow, the hair is dark-coloured, the muscles firm and well-marked, the pulse strong and hard, the passions violent, the emotions of the mind quick and impetuous, and the character firm and inflexible. In addition to the state of the blood vessels, it appears to have some material connexion with the development of the liver and biliary secretion. And Richerand remarks that when any organic disease exists in the abdominal viscera, the vital and animal functions are feebly and irregularly performed, the skin becomes of a deeper colour, the countenance gloomy and disturbed, the alvine evacuations scanty, the pulse hard and contracted, the imagination dull, and the mind suspicious. By some the melancholic temperament is considered rather as a state of disease than any thing else. The bilious temperament predisposes to affections of the liver, to eruptions, to organic diseases and derangements in the alimentary canal. If the proportion of the liquids to the solids is too great, this superabundance always gives a predominance, says Richerand, to the lymphatic system, and the whole body presents a greater volume in consequence of the development and fulness of the cellular texture. The flesh is soft, the complexion pale, the hair of a light colour, the pulse weak, slow, and soft. The form is round and without expression, all the vital actions are more or less languid, the memory is treacherous and the attention wandering. This forms the pituitous or lymphatic temperament, and those who possess it are liable to catarrhal affections, to chronic discharges, to dropsy and scrofula; and the greater part of the acute diseases with which they may chance to be affected, exhibit a want of reaction and a slow progress.

That property which renders us more or less sensibly affected by external impressions, which is weak in the lymphatic, moderate in those who are of the sanguine, and sufficiently active in the bilious, when it exists to excess, constitutes the nervous temperament. This is most commonly acquired, and may be the consequence of a sedentary and inactive life, of excessive indulgence in pleasure, or of an excited and overheated imagination. The muscles are soft and ill-nourished, the figure is thin, the sensations are acute, and there is great vacillation in the determinations and opinions. This temperament gives a predisposition to hysteria and convulsive or nervous affections, and to various disturbances in the intellectual

faculties and sensations, and it generally modifies acute affections by rendering their progress irregular, and their termination uncertain.

As these temperaments become more or less combined, a great variety may be produced, and, of course, as one more particularly predominates, this gives its character to the predisposition to disease. Cabanis enumerates six principal temperaments, characterized also by the preponderance of some particular organ or series of organs, and which do not materially differ from those just described. He considers that in the melancholic, the liver and epigastric system act feebly, whereas in the bilious, they are active; and he forms a sixth, distinguished by activity in the muscular system, in contradistinction to the nervous temperament, in which the sensitive predominates over the moving system. But we are not, I think, warranted in attributing the varieties observed in the temperaments to a supposed preponderance of any system or series of organs over the others, since that balance and harmony so necessary for the maintenance of health would in this way be disturbed. Although we may discard the theories proposed to account for the manner in which they are produced, we are perfectly warranted in conceiving that the temperaments really exist.

Many circumstances connected with the mode of life and habits of the individuals may have an effect in modifying their temperaments. Most probably in the olden time, from the peculiar habits of the people, separated, as they were, into different tribes, with which they chiefly associated and intermarried, any peculiarities would be more concentrated and more defined; while as new modes of life and a greater intercourse with different races sprang up, peculiarities of constitution and character might thus be modified. The different nations of civilized Europe vary in their characteristic traits, and each nation affords abundant variety of temperament. But if we observe a peculiar people like the Jews, more especially those who have preserved their institutions and customs unchanged, we shall find fewer decided differences in their physical characters.

The power of *habit* is undoubtedly great. "Besides the mechanical or chemical changes," says Cabanis, "which organised bodies are all equally capable of undergoing, besides the particular kind of reaction which they exert upon bodies whose influence they feel, yet without any visible alteration of their nature, they may acquire an entirely new liability to receive certain impressions and to execute certain movements. They appear to lose, to a certain degree, their original dispositions, and to acquire new modes of action, which go on, or are again reproduced, even in the absence of the causes which excited them."

Man may, indeed, by perseverance habituate himself to great changes, and may support considerable variations from his natural mode of life with impunity. He may accustom himself to the most rigid diet, or he may habitually indulge in the greatest luxuries. He may live in situations which are hurtful from their

low or high temperature, or other causes, and yet escape disease, although, more generally, he acquires a liability to be affected by those diseases to which this mode of life gives a predisposition. It may also be remarked that the power of habit is sometimes very remarkably shown in disease. Thus we find, that persons who have had repeated recourse to bleeding, at length become so habituated to the necessity of it, that they require its repetition at the accustomed time. So hemorrhages by their recurrence, at length, produce a peculiar predisposition to them, which appears, in many cases to originate, or at least to be maintained, by habit. We find women acquire a habit of having the catamenia at irregular periods, at longer or shorter intervals, with or without any alteration in quantity or quality. Some women acquire a habit of miscarrying. Dr. Heberden relates a case where a lady miscarried thirty-five times. Some again will miscarry only boys, and carry on the girls to the full period without inconvenience, others again will miscarry girls only.

The different *pursuits* in which men are engaged, their trades and their professions, may operate as predisposing causes. The senator eagerly engaged in frequent and energetic debate, is rendered liable to affections of the chest and larynx, while many sedentary occupations bring on affections of the digestive organs, or a train of disturbances in the nervous system. The different *habitations* in which they live may also be mentioned; thus, the densely crowded population of a poor district, confined almost entirely to hot and ill-ventilated rooms acquires predispositions to diseases, which are almost unknown in the well-ventilated houses of the richer class. To this, too, may be added the difference in *clothing* and in *diet*, both of which, even in themselves, are found sufficient to predispose to disease. Thus we find that exposure of different parts of the body to cold, from defect of clothing or from fashion, will favour its action upon them. And, indeed, some varieties of dress, or rather improprieties committed under the sanction of fashion, may even excite disease, as tight-laced corsets, which prevent the intercostal muscles from being properly called into action, and cause the breathing to be carried on by means of the diaphragm, thus impeding respiration, and preventing the requisite changes in the circulating fluid. Proper attention should at all times be paid to a due degree of warmth of clothing, especially in the two extremes of life, youth and age; but the extremes should always be avoided; too little clothing being apt to favour the occurrence of pulmonary diseases, rheumatism, bowel complaints, and, in females, of suppressed and difficult menstruation, while too warm clothing renders the body more liable to suffer from impressions of cold, and tends to relax and debilitate the system, especially if, as is generally the case, the additional error be committed of living in over-heated rooms.

The *diet* which man is capable of living upon is various, and indeed, it seems requisite that he should not confine himself to the

use of any one particular kind. A due and just admixture of the several species of simple food, is best suited to the full and healthy nutrition of the body, and the diet should be varied according to circumstances, as age, mode of life, occupation, &c. The meal which would be more than enough for one living in ease and quiet, would but ill suffice to allay the craving appetite of a stout labouring man. Any excess in diet is bad, for although occasional ones may be committed with impunity, any long perseverance in them would be attended with serious effects. Any defect in diet, either in quality or in quantity, is also injurious, and each of these errors gives predispositions to particular classes of disease. Strong and high seasoned meats, especially in great variety, not only in themselves are injurious, but, from the temptation which they afford to partake of many, and to eat much more than is sufficient to allay the appetite, prove still more hurtful. In this way, in persons who naturally would be considered free from any such liability, a predisposition may be acquired to gout and apoplexy, which, in some instances, may be so strong, that the slightest exciting causes will induce an attack. The habitual use, to any excess, of the different intoxicating liquors which have long been the bane, and in many instances the curse of society, is even more dangerous than excessive indulgence in eating. It has been remarked by authors, that in Persia, where they follow strictly the law of Mohammed, and religiously abstain from wine, gout and calculous diseases are so rare as almost to be unknown, while on the contrary, they are very common in wine districts. Bruce found the stone a very rare disease on the borders of the Nile, in Egypt, in Arabia, in Abyssinia, and in the kingdom of Sennaar. He speaks, however, of an aga, whom he treated for a nephritic attack, and this man was a great drinker.

Not only should great attention be paid to the various ingesta, but also to the *egesta* of the body. Slight changes may take place in the different evacuations, and no inconvenience be perceived. But if for any length of time they are scanty, and not proportioned to the quantity of food taken, and to the wants of the system, a degree of plethora will be produced, and a predisposition given to diseases consequent upon such a state. If, on the contrary, they are very copious, and sufficient nourishment is not afforded to the body, a train of opposite diseases may be the consequence. The excess or suppression of natural or artificial evacuations may produce the same effect. In some cases, the regular occurrence of these evacuations may even produce a plethoric state. For the system having become habituated to them, lays up a store, as it were, to supply this evacuation, either by diminishing the others, or by assimilating to itself a greater proportion of the aliments, and thus the very means which may have been employed to prevent, may produce the effect wished to be avoided; as for instance, the habitual recourse which people often injudiciously have to bleeding and purgatives.

The partial or general *exercise* of the different parts of the body, may also act as a predisposing cause of disease. A due degree of exercise is essential to health, but if excessive, or persisted in too long, and too often repeated, where it does not bear a due proportion to the rest, or where it is defective, and taken only seldom and in an inefficient manner, it may prove equally injurious.

Various *positions* of the body persisted in for a long time, may also assist in the production of different affections. Thus we find distortions of the spine and pelvis more common among those who are confined during long periods to the sitting posture.

The various *affections of the mind* may also be enumerated, as the passions, or any constant and excessive attention to literary pursuits, or other subjects requiring long and attentive occupation of the mind. Generally the powers of life are less able to resist debilitating causes of disease, as of contagious fever or the operation of the marsh miasms, when the mind is under the influence of depressing passions; while, on the other hand, the body seems to be in some degree guarded against these impressions under the operation of the exciting passions; for what more favours the operation of the exciting causes of fever than the fear of infection?

Many other circumstances might be noticed in considering the predisposing causes. Thus we find *certain states* of the body, as pregnancy for instance, predisposing to disease, the puerperal state too, and the period during which a woman suckles her infant. Particular diseases leave a predisposition to be affected by the same disease at no distant interval, or they induce a liability for certain dissimilar affections to follow as their sequelæ.

EXCITING CAUSES.

It is difficult to separate the predisposing from the occasional or exciting causes of disease; since many of the former, when acting in great intensity, may by their own influence excite disease; and, again, the exciting causes, if not sufficient to produce an attack, may give only a predisposition to it. The exciting causes may be considered to be those which, when applied to the body, accidentally or occasionally, induce disease; but the disease so excited will generally have its peculiar character determined by the predisposing causes. Thus, exposure to cold or moisture may in one produce rheumatism, in another it may bring on an attack of fever, and in a third inflammation of the chest. Generally, the causes giving a predisposition to disease require to be in operation for some time before they produce an effect, and the period required may vary in different individuals, whereas the exciting causes act much more immediately.

To enumerate these latter would be fruitless and almost impossible, since they are so various and so dissimilar. In some cases very slight circumstances seem capable of becoming causes, as slight

alternations of temperature, slight errors in diet, or very partial exposure to cold, and not unfrequently we are unable to ascertain the exciting cause, so slight has it been, or apparently so unconnected with the disease produced.

It may be remarked, that even causes which may be termed specific, do not always produce the effect which might be expected to follow exposure to them, unless the body is in some degree predisposed to receive their action. In the great majority of cases we may consider that a predisposition to them always exists, and that the disease always follows exposure to their influence, except in those cases where the predisposition has been weakened or destroyed, in consequence of the person having already undergone the disease. Yet even in the most decidedly specific diseases we occasionally meet with cases where this does not take place, and in these we suppose that the predisposition is wanting.

MODE OF ACTION OF THE CAUSES.

If after we had ascertained the causes which appear to have excited a disease, we could in every instance trace the mode in which they had produced such a particular effect, we should in many instances be much advantaged in our practice; but we must confess, that we are often unable to form this conclusion. From experience we know that an individual of a certain temperament, whose mode of life and general habits are of a particular description, will probably, upon exposure to a certain cause, be affected by a disease, whose general nature and character we can in some measure predetermine; and that another, exposed to the same cause, but whose habits and mode of life are different, will be affected probably with some other form of disease. We may even go further, in some instances, and say, that the same individual may, upon the application of very different exciting causes, have some one particular disease, to which he is predisposed, excited; but the mode in which he is rendered so predisposed, we are often at a loss to account for. Many avenues are open for the admission of disease, though all parts of the body cannot be considered as equally exposed. Thus the lungs, the skin, and the different parts of the intestinal canal and organs concerned in digestion, may be considered as more particularly exposed than any other, in consequence of their connexion with external impressions,—and therefore Hüfeland designates them “*atria morborum*,” the gates of disease. To these we add particularly the brain and nervous system, both in consequence of their liability to be affected, from the continual succession of impressions made upon them, and their almost constant action, and also from their aptitude to sympathize with the different morbid affections situated in other parts of the body, more particularly in the alimentary canal.

A great question has arisen on the mode in which the contagious

principle may be introduced into the system, and it has been strenuously disputed whether this takes place by a direct action upon the nerves, or through the medium of absorption. The arguments on each side are ingenious and interesting. Even in the operation of any known specific cause we are also at a loss, for how can we explain the mode in which cow-pox is produced by the application of one kind of virus, while small-pox is produced by another? In poisons we know that each class produces a specific effect, but why, or how does one, when introduced into the stomach, produce death by a degree of coma, one by its immediate action on the nervous system, and another by inflammation of the stomach and bowels? Again, a specific effect may be produced by very various causes.

The action of predisposing causes admits also of great variety, and is often involved in obscurity, though the operation of many may be accounted for. Thus, some by inducing plethora render the individual liable to diseases connected with, or depending on this state; while others, as want of nourishment, or excessive discharges, may, by inducing debility, predispose to diseases of debility. A great difference however, exists in the rapidity with which they act, and in some cases a very slight cause will produce a strong predisposition to disease, while in others strong, and even a complication of strong causes, may be required to give the predisposition, and even these may fail of so doing.

We find that some persons have peculiar modifications in all, or only in certain parts of their economy, which render them more liable to be affected by causes which would not operate on others, and which will produce in them perhaps affections of a particular character, very different from those which might be excited in any other person upon the application of the same agent. Thus particular articles of diet will produce in some erysipelatous affections, and this arises not from any richness or high flavour, for it may follow the mildest substances, as strawberries, eggs, &c.; in others, again, these may induce affections of the bowels, or nettle-rash. Some persons are very singularly affected by particular medicines; thus the mere odour of ipecacuanha will in some bring on a peculiar affection of the breathing, or spasmodic asthma, while in others opium will fail to produce any sedative effect, and may even induce symptoms which we should not expect to follow its exhibition. This disposition to be effected by the action of substances in a manner different from the generality of people, is named *Idiosyncrasy*. Bourdier gives an instance of a man of forty years of age, who had several times, and almost immediately, an attack of intermittent fever brought on, by the introduction of an elastic catheter into the urethra. *Theses de la Faculté de Médecine de Paris, 1809.*

We observe, too, that some persons have a peculiar *Diathesis*, or liability to have some particular set of organs affected in preference to others, or to have diseases of a particular class. Thus if we find a man successively affected with several inflammatory diseases, or if he is affected with two or three at the same time, as inflammation

of the eyes, of the chest, and of the peritonæum, at the same time, and without the application of causes otherwise capable of exciting each, we should say that he had an inflammatory diathesis, and this diathesis would give an inflammatory character to any affections which might arise in him, from causes which in others would be attended by no such consequence.

A particular power of resisting disease appears also occasionally to be possessed by the body. Thus some may expose themselves to contagion with impunity,—and this exemption from disease seems sometimes to be derived from habit, from mode of life, or from other obvious circumstances. In this way it has been remarked that in some of the plagues, as at Paris and London, the tanners seemed more readily to escape. In the plague at London, all those who were engaged in ship-building, and who lived chiefly in an atmosphere abounding in the fumes arising from pitch, escaped. In the hot climates, when yellow fever prevails, the natives, accustomed, as it were, to the disease, escape best. And, on the same account, the Turks look upon the invasion of plague with less fear, and are observed to suffer less from exposure to its contagion; and thus we may account, perhaps, for the impunity with which nurses generally follow their duties in fever hospitals. From some diseases people acquire an exemption by their age, sex, or constitution.

It is always well to ascertain, if possible, the causes producing any disease; but it must be evident that, in many instances, this can be of little importance in a practical point of view, since even when known, their mode of operation in its production is often uncertain and sometimes inexplicable.

The *Interval* which may elapse between the application of the cause and the actual appearance of the disease, varies in different cases. In some it may follow soon after the application of the causes, in others it may not come on for several days, or until after a much longer period. Thus, inflammation follows almost immediately the application of any irritant; hydrophobia may not come on until several weeks or months after the person has been bitten. The interval which elapses between the period of exposure to contagion and the appearance of the disease, is also various.

DIVISION OF DISEASES ACCORDING TO THEIR CAUSES.

Diseases may be divided into two classes, the *connate* or *acquired*. Connate or congenital diseases are those which the infant labours under when born, diseases which it may be said to bring with it into the world. It does not follow that these are hereditary, although the congenital may be an hereditary disease. But many of them are such as the parents have not had, and, generally speaking, hereditary diseases show themselves at a later period. Thus hydrocephalus may be a congenital disease, the child may be born with the disease more or less strongly marked; syphilis may be congenital and also hereditary, since it has been derived by the infant from one or both of its parents.

A singular fact may be occasionally observed in some families; the parents may be healthy, and yet all or most of the children may labour under some affection or peculiarity of constitution which is not derived from hereditary predisposition. In this way we may see scrofula in all or most of the children, when both the father and mother, and even their parents, have never had symptoms of the disease; so all the daughters of even a numerous family may be barren; and many more instances might be adduced. Portal considers that these depend upon the constitution of the parents, but that not having appeared in them, they cannot be considered hereditary.

The great majority of diseases belong to the class of *acquired*, *accidental*, or *adventitious* diseases, which do not come on until after birth, and are not the consequence of hereditary predisposition. These may be divided, according to the causes which produce them, into several classes, as *sporadic*, *endemic*, *epidemic*, *contagious*, *idiopathic*, and *symptomatic* diseases.

When a disease attacks only one person at a time, or a few persons who have apparently no connexion with each other, we say that it is *sporadic*. Diseases of this kind are the most frequent, and are found at all ages, in all seasons, and in all climates, and are the consequence of individual causes. "Diseases scattered up and down, which they call sporadical," says Gaubius, "having arisen not from some common cause, but from some vitiation or irregularity peculiar to every one, belong to divers genera." "Morbi illi qui neque communiter neque in peculiari quâdem regione grassantur, ii sunt, quos vocamus sporadicus."—CALDANI *Inst. Pathol.*

Endemic diseases are those which are produced by a concurrence of causes, acting constantly or periodically in particular situations; so that the diseases which result from these causes are always occurring, or at least appearing at certain periods, and affecting a greater or smaller proportion of the inhabitants. Caldani says, "Endemicos appellamus eos, qui sive regionum, sive civitatum, sive locorum quorundem peculiarium, proprii sunt, ita Bronchocele, vulgò il Gozzo, morbus est alpinis gentibus familiaris." It is often very difficult to account for these endemic diseases, to assign any good and valid reason, why some particular disease appears in one country or district, when it is unknown or rare in another situation, to which exactly the same conditions appear to apply. In some instances, indeed, we find the same disease endemic in situations very different from each other. It has been supposed that as each country has its peculiar animal, vegetable, and mineral productions, so also that it may have its peculiar diseases, which depend upon unknown causes. Undoubtedly, in many cases, peculiarity of climate or of soil gives to the different vegetable productions a peculiarity in different situations, which we cannot by artificial means acquire or by reasoning explain. So it is with some diseases which are fortunately not common in other regions, and whose origin and causes are very obscure. To a certain point

we can advance by observation; since from experience we know the general effects of heat and cold, and of peculiar soils and climate, and as by cultivation we can improve the condition of a country in an agricultural point of view, so by proper attention in removing or altering its peculiarities, we can, in many instances, very much check the ravages of its diseases. The Romans, along with their conquests, conferred great benefits upon the countries subjugated to their victorious arms. Wherever they established their dominion, they attempted to introduce such changes as appeared to them advisable. The remains of their aqueducts testify their exertions in the attempt to carry a salubrious supply of water over many barriers and obstacles to dry and barren places. These must have materially benefited vegetation, and perhaps, if properly kept in repair, might have been the means of converting many useless wastes into fertile plains. But we have abundant proofs of the influence which cultivation possesses over the salubrity of any district, in the effects which have followed it in our own country. Not only, however, peculiarities of soil or climate, but a number of other causes, also exert an influence in the production of endemic diseases. For although food, mode of life, occupation and general habits, are not perhaps capable of producing them, yet, if properly attended to, they may enable a person to resist in some degree, or altogether escape, the influence of disease. A good deal depends, perhaps, on habit, since the original proprietors of the soil generally escape better than the new settler. A period of seasoning, as it is called, is generally required, and frequently, by proper attention during this, many of the diseases peculiar to the climate may be avoided.

“Epidemicos illos dicimus, qui plures eodem tempore corripunt, verum non sunt proprii unius potius loci quam alterius; quique secundem ferientem dispositionem individuorum quos aggrediuntur, varia inferunt symptomata plus minusve periculosa, quo fit ut non raro sub specie aliorum morborum in diversis subjectis sese præbeant.”—CALDANI *Inst. Pathol.*

In the early periods of medicine, *epidemic* diseases were attributed to the Celestial anger. Hippocrates particularly devoted himself to the different conditions of the air, and he remarks, that if any one will engage himself in the study of the nature of the preceding seasons, and of the existing season, he will be able to predict what diseases will prevail either in the summer or in the winter.

Sydenham, Boerhaave, and Van Swieten, do not wish to comprehend under the title of epidemic diseases, any but those which are produced by a cause which is not evident, by some vitiated and concealed state of the air, which changes the character of all the intercurrent diseases, independent of the epidemic, and which causes these diseases to participate in the character of the epidemic. Thus, when typhus fever is epidemic, a case of pleurisy which may occur, will have some of the characters of this fever, as was the case in the year 1676.

Van Swieten remarks, that it will occasionally happen, that many individuals may fall ill at one time, in consequence of improper food or drink; as for instance; in years of scarcity, or in besieged cities, many diseases may arise and spread in consequence of using damaged wheat, from the want of proper vegetables, from the corrupted state of the water in the wells, &c. Yet, these causes will not produce the surprising character of the epidemic constitution, which has the power of bringing to one character all the other diseases. For those who can avoid these, or whose nourishment is better, will escape the disease. Thus, in besieged towns, while the private soldiers and the poor inhabitants are ill, because they live on bad food, the officers and richer inhabitants continue in good health, and the besiegers also, if they do not want victuals, remain well. Therefore, we cannot deduce the nature and character of any epidemic, from any sensible alteration or defect, in any of the six qualities named non-naturals. To this, however, we cannot in all cases agree, since from these very causes may arise a contagious epidemic, which may spread rapidly, and cause great mortality both among rich and poor, among the well and ill-nourished equally. It has also been observed that, as the changes which take place in the atmosphere during the course of an epidemic, do not always produce a marked change in its progress, we cannot therefore attribute it wholly to any particular state of the sensible qualities of the air; and Sydenham, who occupied himself very much on this subject, says, that for many years he endeavoured to trace in each the meteorological phenomena, and to discover some connexion between these and the cause of the prevailing epidemic, but in vain; for the result was, that with the very same atmospheric qualities there would occur very different diseases.

Galen remarks, that an endemic is always found affecting the inhabitants in certain countries, while an epidemic only rages at certain times, has a limited course, and is not confined to particular regions, but may make its appearance in any town, or in any country, without any reserve. This seems a correct distinction, if we bear in mind, that an endemic may under certain circumstances become epidemic, particularly when it belongs to the febrile class.

A difficulty sometimes arises in deciding whether a disease which makes its appearance and attacks at the same time a number of persons, should be considered as an epidemic or a contagious disease; whether, in fact, it arises from particular causes, equally operating on all, or whether it arises from contagion directly or indirectly applied. A contagious disease may arise, and affect a number through the means of contagion, and thus, under certain circumstances, perhaps a district might become so tainted that the disease might reign as an epidemic, and persons become affected independent of any direct communication with the infected. In some instances, it is very difficult to trace exposure to contagion, and persons who have apparently had no communication with the

infected may seclude themselves, or keep out of the way of the disease, and yet suffer from it. This would give rise to the supposition that the disease was not contagious, but epidemic only; yet these persons may unwittingly have carried with them into their seclusion the contagion to which they had been exposed, without their knowledge or recollection of the circumstance, which is said to have occurred in the plague at Marseilles.

M. Magendie states, that animal substances in a state of putrefaction are so highly deleterious, that the least respiration of air containing this matter may produce dangerous consequences. In certain parts of America, in the neighbourhood of low, partially cultivated localities, or where the atmosphere has been corrupted by neglected markets, and filth of all kinds allowed to accumulate for a length of time, these exhalations have produced a malady accompanied in various districts by great mortality; and he lays it down as a general principle, that in all cases of the production or propagation of yellow fever or hospital typhus, the atmosphere in which the affected individual resides, is charged with putrid animal matter, in the form of vapour.

When any contagious disease is not confined to a small number of persons, but has made great progress, and great numbers are attacked by it, it generally receives the title of epidemic. Again, it is supposed that an epidemic may sometimes become contagious, since the air having a new source of vitiation in the great number of sick, may change the character of the disease, render it more intense, and give to it the power of spreading itself by contagion. Humboldt, who is opposed to the contagious nature of yellow fever, admits that it may become so in this way.

An interesting account is given of several epidemics and their origin in Foderè, *Medicine Legale*. See, also, Wallis's edition of Sydenham, where a general view is given by Dr. Sims, of the most remarkable epidemics in England. In many, we must freely confess our ignorance of the real cause, and admit some peculiarity in the atmosphere, which in the present state of our knowledge we cannot detect or account for.

Diseases are also divided into *idiopathic* or primary, and *symptomatic* or secondary diseases.

An idiopathic disease arises from some cause operating upon the body "ab externo;" whereas the symptomatic depends upon some other disease or affection, of which, in fact, it forms a symptom. A primary disease, produced by any cause, either during its continuance or after its termination, may itself produce or be followed by a disease of some different part, and even of a different character. Thus, convulsions may arise from some cause directly affecting the nervous system, or they may be produced by some other disease, as, for instance, worms in the intestinal canal. Vomiting and functional disease of the stomach, may be produced by causes immediately operating on the stomach, or they may be induced in the same or greater intensity by affections of distant parts.

It is often of great importance in practice to keep this distinction in view, and to ascertain whether a disease is in fact idiopathic, or symptomatic only of some other affection. This is not always easy, since the secondary affection will occasionally be much more violent than the primary, so as more or less completely to obscure the real cause upon which it depends, while in others, both the primary and secondary affections appear to alternate and mutually occasion each other, or their symptoms becoming intermixed, exhibit a disease of very complicated character.

A young girl received a blow upon the head, symptoms of compression were present, and it was doubted whether some injury requiring the use of the trephine might not have been inflicted. The operation was, however, delayed, the bowels were particularly attended to, and after some smart purging and other means, the affection of the head entirely disappeared. But whenever the bowels became constipated, affection of the head regularly followed, and was as regularly relieved by setting the bowels right. In this case, the injury done to the brain was, in the first instance, the cause of the constipation; this symptomatic affection, however, appeared to become the principal, and in its turn capable of inducing the cerebral symptoms.

MODE OF ATTACK. PRECURSORY SYMPTOMS OF DISEASE.

Previously to a disease actually making its appearance, in many cases, the patient is affected with sensations different from what he feels in his ordinary state of health, and which cannot, perhaps, be referred to any particular disease; for many come on almost in the same manner. The patient is not absolutely ill, yet he is not well, and this state continues, for a longer or shorter period, until some decided sign of a particular disease is observed. This is often the case in acute diseases, but if any particular one is prevalent at the time, we may form some idea of the probable nature of the attack, more particularly if we can connect it with any exposure to the influence of causes likely to occasion it. We are sometimes assisted, also, by the age of the patient, the season of the year, or accidental circumstances. Thus, a child is attacked with general febrile symptoms, attended or not by catarrhal symptoms; these may be slight or severe, and if they come on, when measles are prevalent, in a child who has never had the disease, we are naturally led to suspect that he may be affected with this disease. Otherwise, there would be nothing in these symptoms which would lead us to infer that he should have this particular disease, since they are applicable to other febrile affections.

In some cases, where the disease does not arise from a specific contagion, these precursory symptoms may go off or be relieved by art, and the patient not suffer any further attack. They vary very much; thus, they may be those of diminution of the powers and

sensibility of the body, or these powers may appear even more vigorous than usual, so as occasionally to mislead the patient or his friends into the belief that he is in better health and spirits than usual. In some cases, *peculiar sensations* are noticed as indicating the approach of disease. Thus a patient will have had the sensation of cold, as of cold water trickling down his spine, which occurs often in febrile diseases. He will have experienced some affection of the vision, as generally occurs in apoplectic seizures. In other cases, very anomalous precursory symptoms may have been remarked, or recalled to the recollection after the occurrence of the disease; but these are not to be depended upon, and similar symptoms may precede very dissimilar diseases.

The precursory symptoms occur at a longer or shorter period before the appearance of the disease, and sometimes they decline, but more generally they gradually increase or become confounded with the real symptoms of the disease. They bear, in many instances, no proportion to the affection which succeeds them, for they may be slight and the disease a very serious one, or a very trifling affection may follow severe precursory symptoms.

SYMPTOMS.

Every perceptible change which occurs in any organ or function, and connected with or indicating the existence of disease, is named a symptom.

The symptom is apparent to the patient, and to any one unacquainted with its nature and cause; but the physician may go beyond this, and perceive to what affection this symptom belongs, of what morbid change it is the *sign*. A man has pain in his side, of which he is perfectly sensible, but he cannot say what it may indicate. The symptoms, then, may be perceptible to any one; the sign can only be justly appreciated by the medical man. Besides, the sign may be deduced from other circumstances, as well as from the symptoms, as, for instance, from the causes. The symptom is perceptible to the senses, the sign is formed by the judgment, it is deduced by reasoning from the symptom.

To constitute a disease we have generally several symptoms present, and yet, although intimately connected with it, they do not in reality constitute it. Otherwise we must have as many diseases as we have symptoms, for they are gradually changing; and in some instances, although the disease remains the same, the symptoms alter. Thus, in inflammation, we have heat, pain, redness, and swelling, given as its symptoms; but one or more of these may change, or be wanting, and yet the disease be still inflammation. Sometimes a single symptom may appear, as vomiting, purging, or simply pain, but most commonly many are present, and these are connected in such a manner, that by their combinations we are enabled to discover the nature of the disease.

All the symptoms are not of equal value. Some are so connected that they make their appearance at the same time, or in rapid succession, and depend mutually on each other. Others, again, appear in different stages of the disease, and may be the consequence of it, or of accidental circumstances more or less important. Even in the symptoms which appear at the same time in the course of the disease, we find an unequal degree of importance; and we have those which may be termed essential or characteristic, and those which are merely accessory. When the affection is a general one, when in fact, the whole system is nearly equally affected, we consider the most marked or most prominent symptoms the most essential. But in cases where any local affection exists, we do not judge by the intensity of the symptoms alone, but by the particular nature or value of the organ and its functions in the economy; and thus, perhaps, symptoms very slight in themselves may become the principal ones, in the case of an important organ being affected, although we may have much more marked symptoms present, which can only be considered as accessory.

Great difficulty sometimes will arise in estimating the different symptoms. In cases where much general disturbance exists, we should select such as will lead us to detect what particular organs or functions are most materially affected. We must separate the primary or the local from the secondary, or the general symptoms. Thus if we find a patient labouring under pain in the side, increased on inspiration, dry cough, difficult respiration, hard pulse, heat of skin, flushed face, thirst, and symptoms of disturbance in the system generally, we recognise inflammation of the pleura, and can account for the local symptoms of pain, cough, and dyspnœa, as well as for the others of general affection of the system consequent upon the disturbance in the respiratory organs. In many cases, however, we cannot thus readily separate them, nor can we detect any connexion between them, so that we are often obliged to refer their origin to sympathy.

Sympathy is that property or faculty by which the various parts of the body exercise a mutual influence over each other, in many cases independent of any apparent connexion between them to account for it, so that parts are often sympathetically affected, which are distant and apparently not directly connected with that in which the disease originated and has its seat. Great differences of opinion have existed on the cause of sympathy. Bichat remarks, "that this singular phenomenon often shows itself in a state of health; but it is so wonderfully increased in diseases, that if we were to take away from each the symptoms which did not exclusively depend upon the disturbance of the function which is particularly affected, they would offer a degree of simplicity as easy of study as they would be simple of cure. But scarcely is an organ affected, before all the others seem at once to take the alarm, and each seems anxious to exert itself in the expulsion of a morbid cause which has fixed upon one of them."

Most writers consider that the nerves are the medium through which this general connexion between the organs takes place. The different anastomoses between them are accounted for on this principle. Some are of opinion that the brain is always intermediately affected, while others reject the medium of the brain. The communication of parts by means of the sanguiferous system has appeared to some as the cause of sympathies, while others have hinted at the continuity of the cellular texture. J. Hunter divided sympathetic affections into three species, the continuous, the contiguous, and the remote: as they seemed to be extended by continuity of surface, by contiguity, or as they occur in remote organs, which might be similar or associated in their general functions, or which might be quite unconnected. Bichat considers that the causes of sympathy are very obscure; but as diseases should be studied not as affections of the whole organs in which they may exist, but in connexion with the different textures of which they are composed, and which they attack, he says, almost always singly, so he conceives that when the phenomena of diseases are sympathetic, they follow the same laws as when they arise from a direct affection. When, for instance, in the stomach, the muscular fibres contract, and vomiting is produced in consequence of the influence of some other organ, they alone receive this impression, the serous or mucous surfaces not being affected; otherwise we should have had in either case an exhalation, or an exhalation and a secretion produced sympathetically. He cites other examples, and concludes that sympathetic affections are but so many aberrations in the vital properties, or of those properties which vary in every texture, and that they will also be different in different textures. He admits, however, that in many instances where one texture of an organ had at first only been affected, it may gradually communicate this affection to the other textures, and thus, the whole organ may become implicated in the disease. But that although we may have some difficulty in establishing the primary seat of the disease, we should err in ascribing it to what we may observe in the present state of the organ. Upon whatever sympathy may depend, and in most cases certainly its cause is very obscure, we must admit its great importance as an agent in modifying the symptoms of diseases.

Some writers, but especially the older, have made a division of the symptoms into those of the disease, those of the cause, and those of the symptoms. These distinctions deserve little regard, although it may be well to point them out. Thus the symptoms of the cause were considered to be those accidental phenomena which may come on in the course of disease, and which appear to depend not on the disease, which does not generally produce them, but on the cause of the disease. These may go off while the disease still remains, or they may increase and even remain after the disease has ceased, and form even a more serious affection than that during the progress of which they have made their appearance. The

effects which attend as a consequence of any particular symptom, were considered as the symptoms of the symptom, and these might accompany either those of the disease or of the cause.

All the symptoms of a disease do not come on at the same time, but generally in those diseases which are rapid in their progress, the principal symptoms show themselves very soon, while in diseases of slow progress they may not appear until a late period. In all diseases, however, we may have different symptoms making their appearance, which are not absolutely essential to the disease, though they are in some degree the consequence of it. These are named *supervening*, and many of them so generally come on, that they almost appear to make part of some diseases; and although we meet with instances in which they are wanting, yet they form a great feature in their history. A variety of accidental symptoms may also come on, arising from causes casually acting upon the patients, as from error in diet, or some other imprudence.

Both the supervening and accidental symptoms may be considered in two points of view. In one they may be such, both as to their nature and degree of intensity, as very materially to add to the danger in which the patient is placed; while in the other, they may exert a salutary influence over the disease, and be looked upon as signs of importance in its alleviation or cure.

I. SYMPTOMS OBSERVED IN THE GENERAL EXTERNAL APPEARANCE OF THE BODY.

These may be remarked when we first see the patient, and in some instances lead us to form an idea of the disease under which he labours. Under this head are comprehended the attitude, the general appearance of the body, its size or volume, its strength, the colour of the skin, any eruptions which may be upon it, or any appearances differing from what we see naturally.

The Attitude.—It is considered by some most proper to examine the attitude of the body during sleep, because the will of the patient being then suspended, cannot produce any effect upon the movements. This is certainly often useful, but in many cases we also wish to have some movements executed by the operation of the will, and to see our patient in different positions, so as to ascertain their effect upon him.

In disease, the attitude is generally, in some degree, altered from the ease and freedom which characterize it during health. Sometimes there is a languor and depression, an unwillingness to motion, as in febrile diseases; sometimes, as in mania, a determined and resolute attitude, as of defiance and strength. In some diseases the attitude alone is sufficient to determine the disease, as the immoveable position in catalepsy, the irregular and unsteady execution of the movements in chorea. In paralysis different parts are unable to perform motion, and different degrees of distortion

are produced. In convulsive diseases, a variety of irregular motions occur at intervals, or one regular and permanent contraction is observed; and in tetanus, the varieties are named as the body is bent like a bow, backwards or forwards. In many instances we do not remark any peculiarity in the position which patients assume when in bed, but in others we observe them placed in one particular attitude, which may be considered as peculiar to their disease. In great debility the patient lies on his back, with his limbs extended, and a degree of flaccidity and of inertion is observed in all parts of the body. In some cases he lies in this position to avoid the uneasiness or pain which he may feel on assuming any other, as in rheumatic affections; while at other times he does so with his legs drawn up so as to take off the action and pressure of the abdominal muscles, as in inflammation of the peritonæum or intestines. Sometimes a patient lies upon his belly, or assumes some other position which may enable him to make pressure upon the abdomen, as in cases of colic. In other cases, he will be found always lying on one side, and never changing his position, or complaining of great pain or uneasiness whenever he makes the attempt. Thus when effusion has taken place into one side of the chest, the patient lies most easily on that side. In pleurisy, too, Laennec remarks, that the patient will generally be found lying on the back, or on the side affected with pain, and cannot remain any time on the sound side without feeling a sense of suffocation; it is not uncommon however, he adds, to see the contrary, and many lie only on the sound side.

In inflammation of the liver the decubitus is on the right side, it is almost impossible on the back, and generally completely so on the left side. In some affections of the chest, as in hydrothorax, when there is effusion in both sides of the chest, the patient is unable to lie down,—he sits up in his bed, or supported by pillows; and this is also the case in some diseases of the heart. Where effusion has taken place in the pericardium, we often find the patient not only sitting up, but inclining as much forward as he can, so as to be bent almost double; but this symptom is sometimes absent. In cases accompanied by difficult respiration, especially where aneurism of the aorta, or any tumour presses upon the trachea, the patient may assume some singular position which is rendered easy, and therefore habitual, in consequence, perhaps, of the tumour thus producing less pressure, and so rendering the passage of the air more free. Occasionally we find those affected with laborious respiration sitting up or very much raised in bed, but with their heads thrown as much backwards as possible. Patients are sometimes constantly changing their position and attitude; they appear in a state of great agitation, tossing their limbs about, uneasy in every position almost as soon as they have assumed it, and placing themselves in attitudes which appear even singular and uneasy, as in some affections of the heart.

The size or volume of the body may be increased or diminished

in disease. In some instances we find it increased in consequence of a too great activity in the nutrition of the body, but in the majority of diseases it is much more apt to be diminished. Although the accumulation of fat and increase in size are rarely observed in disease, yet in some local affections, where the patient is obliged to avoid exercise and is not subjected to any material alteration in diet, they may occur, but can never be considered as disease unless carried to a great extent. The effect which attention to diet can produce in cases of polysarcia may be well illustrated by the life of Cornaro, and the case of Thomas Wood, the fat miller, in the second volume of the *Transactions of the College of Physicians*.

Increase in the size or volume of the body is almost always owing to an infiltration of serosity into the cellular membrane, which is called anasarca when it is general, and œdema when only partial, as when it is confined to one limb, or to the lower extremities only. It consists of a diffused swelling of the part, or of the whole of the body, which is generally of a paler colour than natural, semitransparent, readily receiving, and retaining in most cases, the impression of the finger, and changing its situation, more or less, in consequence of a change in the posture, so that the depending parts are always most affected.

Two varieties are described in the older writers, to which the names of anasarca and leucophlegmatia were given. In the latter of these, the affection appears generally over the body in the first instance, while in the former it commonly commences in the lower extremities; but it affects also the other parts of the body, although the fluid is not so readily passed from one part to another by change of posture. In this, too, there is less tension, and a moderate pressure readily produces a considerable indentation, which lasts for some time after the pressure is removed; while in leucophlegmatia there is more tension, and a less considerable and less permanent indentation. The distinction in name is now little attended to, though we may in many instances remark a decided difference in the degree of tension and the facility with which the impression of the finger is received and retained. Thus, in the œdema or anasarca which follows scarlatina, and in cases where it appears to depend upon or be connected with increased action, or a degree of inflammatory affection of the cellular membrane, the tension is great, and any indentation scarcely perceptible; and the same difference may be observed generally between the idiopathic affection or real dropsy, and symptomatic œdematous swellings.

When an accumulation of air takes place in the cellular membrane, which happens rarely, it is called emphysema. It is characterized by a colourless shining elastic swelling, which does not readily receive the impression of the finger, but in most instances only yields to it, and gives a particular sensation of crackling, called crepitation. It most commonly takes place in cases of penetrating wounds of the chest, where the continuity of the air-pas-

sages is involved, so that the air passes into the laminæ of the cellular membrane. In some cases, where it occurs spontaneously, it has been supposed to depend upon a secretion of air taking place in the cellular membrane itself.

Diminution in the volume of the body takes place in the cold fit of intermittent fever, and thus we find that ligatures which had been previously tight now become slack, so that a ring which in health only just fitted the finger will be so loose as readily to fall from it. This diminution passes off as the stage goes off; but, in almost all cases, any diminution which takes place in the bulk of the body may be attributed to emaciation, and to a real decrease in size, very remarkable in chronic diseases. It varies much in degree, and may be referred to a deficient reparation, which bears no proportion to the losses experienced by the system. At the close of acute diseases, especially where severe depletory measures have been employed, often about the period of convalescence it is remarked; as also in diseases accompanied by excessive evacuations, as cholera, diabetes; and what is worthy of notice, it is seen in cases where the appetite is great, and the quantity of food taken is considerable, but where the nutrition seems to keep no pace with this, and it then forms a very unfavourable symptom. In pulmonary consumption this is often very remarkable, as also the rapidity with which in this disease the emaciation sometimes takes place. Along with the increase or diminution in the size or volume of the body, must be taken into account the degree of firmness and resistance, or the softness and flaccidity of the muscles.

The skin varies in disease in the quantity and nature of its exhalation, but this comes more properly under consideration in another place. It also exhibits great difference in colour, and is liable to a variety of eruptions and appearances produced by accidental causes.

The colour of the skin varies even in health. Thus climate, the seasons, sex, age, and the passions, produce in many instances great alterations in it. In disease, we often see it remarkably changed, and in some instances can decide upon the nature of the disease by observing it. In all excessive evacuations there is paleness of the skin, as also in syncope, and in the cold shivering at the commencement of acute diseases. In some affections accompanying this paleness there is a peculiar transparency, as in chlorosis, or after great hemorrhages, arising from deficiency of blood in the capillary vessels, or in anasarca, from distention of the skin with fluid; in others, as in intermittent fevers of any long continuance, the skin is pale, and at the same time of a yellowish tinge. In some instances this yellowish tinge becomes of a much deeper hue, as in jaundice. For where any impediment exists to its free passage, the bile becomes absorbed and colours the textures into which it is carried, so that every gradation, from a slight tinge to the deepest tint, may be observed in cases where the hepatic system is deranged. In one species of jaundice Dr. Baillie remarks

that the skin and white parts of the eyes are tinged of a green colour, more or less mixed with yellow, but the green colour is very predominant over the other, and in some parts of the skin the green colour is very deep, so as to have some blackness in its hue, and this has given rise to the name of black jaundice, by which this disease has been often distinguished.—*Coll. Trans.* vol. v. Rostan observes, "There is a yellowish tinge of the skin which makes its appearance about the lips and angles of the nose, in inflammatory affections of the abdomen, and more particularly in pneumonia, which may be mistaken for the beginning of jaundice by superficial observers."—*Médecine Clinique*, vol. i. 475. Occasionally the skin is of a dirty colour, as in some cases of low fever. In many chronic affections, particularly of the heart and respiratory organs, it becomes livid or of a leaden hue; and this lividity is often more marked in particular places, as in the lips, around the eyes, in the fingers, especially at their extremities, or in the lower limbs. This is also remarked in a severe febrile shivering fit, and occasionally it gives a degree of marbled appearance to the skin. Sometimes the skin exhibits a reddish, or rose-red appearance, as in the commencement of inflammatory diseases, and this redness may become very deep, especially in some eruptive diseases. A very peculiar blueish appearance, termed cyanosis, is occasionally observed. This often accompanies that defective formation of the heart, where the foramen ovale remains open, or only partially closed, so as to admit the passage of the blood, in part at least, from the right to the left side of the heart, independent of the pulmonary circulation; and thus we have several histories given of children under the name of *pueri cœrulei*. A preparation is preserved in the collection of my friend Mr. Fawdington of Manchester, in which there is a remarkable deficiency in the septum, forming a much larger communication between the auricles than would have been produced by the foramen ovale remaining open; but in this case, although marked by symptoms of an affection of the heart, there was, I was assured, no alteration in the colour of the skin. This appearance is sometimes independent of any such disease of the heart, and may be caused by some obstacle to the free circulation; but it often appears very remarkably, and very unaccountably, in patients to whom the nitrate of silver has been administered internally, and so as to form a sufficient ground for rejecting this medicine, or at least any long employment of it, in a case where complexion is of value.

In some diseases, the skin is marked or spotted with patches of different sizes and colours. These are often very remarkable in the scurvy, exhibiting a marbled appearance, alternately pale, yellow, pink, blueish, or greenish and black, and so abundant that scarcely any part of the body is free from them, though they are generally most apparent on the arms and legs. As the disease goes off, these spots or patches gradually pass from deeper to

lighter tints, as may be observed in ecchymoses arising from accidental causes.

Some curious cases are recorded where the skin has become black in a very short space of time. Rostan related to the *Société de la Médecine*, that of a woman whose skin became so in the space of a night, in consequence of a strong mental impression. She had witnessed her daughter throw herself out of a window with her two little children. He also mentions, in his *Medécine Clinique*, another case (which he had observed after this) of a woman who during the Revolution had escaped the punishment of death, the intelligence of which was brought to her at the menstrual period; suppression immediately took place, and she became as black as a negress, which colour she retained to her death. He dissected attentively the skin of both these women, and found the rete mucosum to be the seat of the colour. He could easily separate the epidermis and dermis, which presented no change in their colours, and he conceives that it was the result of a sanguineous exhalation into the rete mucosum.

A variety of eruptions may affect the skin, differing much in their appearance. Some of these arise from accidental causes, in the course of other diseases; while others always accompany, and indeed form, the essential character of the febrile affections with which they are combined. Tumours may appear on the skin, and excoriations where an abrasion takes place of the epidermis and the superficial layers of the corion.

SYMPTOMS OBSERVED IN THE EXTERNAL APPEARANCE OF
PARTICULAR PARTS OF THE BODY.

The *head* may be inclined to one side from partial paralysis, or convulsions of the cervical muscles. It is sometimes thrown back or inclined forwards from similar causes. Its size may be increased, and occasionally to a great extent, in congenital hydrocephalus, when the separation of the sutures is very remarkable. Thus in a case at St. Bartholomew's hospital, of a young man, aged 24, the dimensions were, in circumference $27\frac{3}{4}$ inches; from ear to ear, across the head in the direction of the coronal suture $15\frac{1}{4}$ inches; from the external angular process of one orbit to the same process of the other, $9\frac{3}{4}$ inches. In a child aged 8 months, in which the treatment by puncture was adopted, at my suggestion, the head measured in circumference $21\frac{1}{2}$ inches, and across the vertex from ear to ear $14\frac{1}{2}$ inches.—*Ed. Med. and Surg. Journ.* April, 1821. The size of the head is occasionally much increased in erysipelatous affections, or in infiltration of its integuments. Tumours may form upon the head, and some eruptions may be considered as peculiar to the hairy scalp.

The various changes in the *countenance* produced by different emotions and passions, as well as the peculiar expression in differ-

ent individuals, in some degree indicating the disposition, and probably deriving its character from the prevalence of some particular feeling or passion, are familiar to us. In disease, also, the face exhibits a variety of traits difficult to explain, but often easily recognised by an experienced observer; so that in many instances it may be said that a peculiar appearance of the countenance so generally accompanies certain kinds of disease, as to form a pretty faithful indication of their presence. Sometimes it is indicative of stupor, when it is marked by a general want of expression in all the features, and particularly in the eyes; the patient returns with difficulty an answer to any questions, he seems unconscious of anything which passes around him, and indifferent to his situation; yet at the same time unoccupied with any peculiar train of thought. Sometimes it is characterized by the turgescence and redness of the different parts of the face; they seem distended, the eyes are prominent, the conjunctivæ are injected, the eyelids, the lips and cheeks, are distended, red and even violet-coloured. This is seen in cases of turgescence or congestion in the head. The opposite to this is marked by diminution and contraction of the features, which are pale and even livid and contracted, while the face appears lengthened. In this, however, there is only an apparent diminution, and it is often seen at the commencement of acute diseases, particularly inflammation of the peritoneum, and indicating some serious affection. It differs then from that produced by absolute emaciation, the most remarkable degree of which is the *Facies Hippocratica*, which derives its name from the great father of medicine, who has accurately described it. It is seen at the close of some diseases, as phthisis, &c., and may be looked upon as an almost certain indication of a fatal termination. The nose is pinched, sharp and cold, the nostrils contracted, the eyes sunk, the temples hollow, the skin of the forehead dry and wrinkled, the cheek-bones prominent, the cheeks sunk, the lips pale or livid, thin, hanging down, relaxed, and showing the dry teeth; the chin, and indeed the whole face, appears lengthened, the ears are cold and drawn back.

But the face may exhibit a much greater variety of appearances than those already enumerated. Thus, in delirium, it varies very much; and in other diseases it may undergo many changes in its motions, its colour, size, and in the individual features.

The muscles of the face may be almost in constant action, and this affection may extend to all, or be confined only to particular ones. There may be various degrees of tremor, or convulsive motions; or there may be perfect immobility in all the muscles, or only a partial paralysis of some particular one, or of one set, indicating an affection of the brain itself, or only of certain nerves supplying the affected muscles. In cases of great debility, an evident slowness in their motions may be observed, as after great hemorrhages, and in some of these cases are seen slight convulsive twitchings or tremors.

The size of the face becomes occasionally enlarged ; thus it appears swelled and turgid previous to the appearance of some eruptive diseases, or in consequence of determination of blood to the head. But, generally, any increase or diminution of size is not confined to the face, though it forms a good index to the state of the other parts of the body, since these are often remarkable in the face before they are observed in other parts.

The changes in its colour may also be common to it with the rest of the body, or confined to itself. Its redness is usually a sign of general or local plethora, and may be more or less intense, and more or less constant ; sometimes disappearing at intervals, and becoming most remarkable during any accession or paroxysm, extending over the whole of the face, or confined only to particular parts, as to a circumscribed red patch upon the cheeks in hectic fever. Whenever flushing of the face is observed in this latter form, during the progress of a general disease, as fever, we may suspect that the chest is more or less affected. If it is confined to a single cheek, we must ascertain the manner in which the patient lies in bed, for the cheek which has rested on the pillow is always redder than the other. Any changes in the colour of the skin are generally most remarkable, and continue longer upon the face than upon the other parts of the body, as the yellowness of jaundice, or the pallor of debility.

The appearance of the *eyes* is important, and the changes which they undergo may either be the consequence of some affection confined to themselves, or existing in the brain, or sympathetic with some diseased organs distantly situated. At the commencement of inflammatory affections of the brain and its membranes, they are very irritable and intolerant of light, but as the disease advances, and occasionally very early in the disease, the pupils will not contract, or only very slightly, even upon the application of a very strong light ; for, in cases of effusion or congestion, the eyes cease to be affected by visual objects. Sometimes a sort of convulsive motion of the eyes, or strabismus, is observed, or they are fixed, and turned up, or down, or to one side, so as to conceal the greater part of the pupils. This is not always symptomatic of organic disturbance in the brain, since it may occur in hysteria or in infantile complaints, as disordered bowels, or flatulence, or from such causes as would scarcely permit the supposition that it could depend upon any, even a temporary compression of the brain. When any great determination of blood, or much congestion takes place in the head, as in some cases of apoplexy, in asphyxia, or strangulation, and in some affections of the respiratory organs, the eyes appear protruded and larger than natural. This is in a great measure only apparent, since enlargement would appear only to take place in some inflammations of the eye itself, and in hydrophthalmia, &c. In inflammatory affections, the eyes are suffused, and numerous small blood-vessels can be detected in the conjunctivæ, giving them a redness in places where no such appearance could be detected in

health. In jaundice, the conjunctivæ are tinged of the yellow colour before almost any other part; in phthisis and scrofula they are whiter than natural, and thus forming a strong contrast with the darker colour of the pupil, they occasion that sharp and brilliant appearance of the eyes which has been remarked in these cases.

The expression of the eyes varies in disease: in some it is mild, or vacant, or desponding, in others menacing, alarmed, or staring, but generally agreeing with that of the face. In cases where we find it different from what we might expect it to be, or not agreeing with the objects in view, we suspect the presence of some affection of the brain.

The pupils exhibit changes in their power of contraction and dilatation. When they contract slowly or slightly, or remain dilated under exposure to light, we may suspect the presence of a comatose affection, unless we know it to be in consequence of some affection of the optic nerve, or retina, producing amaurosis. "In all circumscribed diseases of the encephalon," says Rostan, "the immobility of the pupil is only remarked on one side." In iritis, and in inflammation of the membranes of the brain, the pupil is contracted. Occasionally the form of the pupil is irregular; this has been observed by Mr. Jadelot, in some cases of intestinal worms. Many diseases occur in the different parts composing the eye, as in the cornea, crystalline lens, &c.; great differences also exist in the sensibility of the eyes in different people. Some suffer much uneasiness from even a moderate degree of light, while others can only see clearly in a very strong light; some can discern objects most easily at a distance, others can only see them when brought very near to the eyes, and we may observe this difference in the distance at which objects can be discerned in the eyes of the same individual.

The *eyelids* generally appear heavy, or to be moved with difficulty, in head-ache, more especially when this is dependent upon increased determination of blood to the head. In comatose affections they are generally closed, and in some inflammations of the eye they are not only closed, but held together by a firm contraction of the muscles, so as to require some force to be applied in order to open them. In cases of great debility they remain half closed, even during sleep, so that the eye is only partially covered. Occasionally they are quite paralysed, indicating some affection of the brain, or of the parts concerned in their motion, while in other cases various twitchings, or convulsive motions, may be observed in them, connected sometimes with affection of the brain; but winking of the eyes frequently takes place, for the purpose of moistening the cornea, or as the consequence of some local irritation. They are liable to alterations of colour and swelling like other parts of the body; in œdema they are often very much swollen and distended, from the looseness of their cellular texture.

Any wrinkling or contraction of the *forehead* denotes pain, and often some affection of the brain, as in hydrocephalus. The pulsa-

tions of the temporal arteries are commonly increased in cases of determination of blood to the head; and Rostan remarks that there is often great contraction of the temporal muscles accompanying cerebral congestion. These, as well as the muscles of the face, are also sometimes firmly contracted in certain convulsive diseases.

We can often judge, by observing the *nostrils*, of the degree of ease or labour with which a patient breathes; being raised and distended, and their movements rapidly performed, in cases where the respiration is very difficult, so that occasionally their motion appears almost convulsive. Where there is great debility, the nostrils are often pinched and contracted, so as to give the appearance of great thinness to the nose; and when any irritation exists in the intestines, as from the presence of acrid matters or worms, and sometimes in diarrhœa, they are affected with a sensation of itching; but this may also arise from local causes, as in epistaxis, before the flow of blood from the nose.

The *lips* in diseases accompanied by great debility, especially in fevers, hang down; and in these, as well as in some nervous affections, they are tremulous. This tremulous motion often precedes vomiting. In painful diseases they are generally firmly pressed together and contracted. The lips are sometimes pushed quickly forwards, and as quickly separated, when the patient makes an expiration, which Rostan compares to the action of smoking a pipe, or puffing, and which he considers a common sign of a strong compression on the brain. Sometimes in fever the patient makes a peculiar noise with his lips and tongue, resembling that which is commonly termed "smacking the lips;" and this my own experience induces me to consider a dangerous symptom. In hemiplegia the lips are said to be drawn to that side which is not affected, the paralysed muscles offering no resistance to those of the opposite side, while in convulsions they are drawn to the side most affected. The lips are sometimes swollen, especially when any eruptions appear upon them; in scrofula the swelling is generally considerable, but confined to the upper lip; this may also be remarked occasionally in cases of intestinal irritation.

Their colour is also important. In inflammatory diseases it is generally bright red, and where the inflammation affects the intestinal canal they are red, shining, and dry. In cases of debility, after great hemorrhages, or excessive discharges in chlorosis and in dropsy, they are pale; while in all cases where the free circulation of the blood is impeded, as in affections of the heart, of the large vessels, or of the respiratory organs, they become blueish, livid, or dark coloured. Sometimes they are cracked or chapped, and occasionally exhibit deep fissures; while at other times, as in low fever, they are more or less covered with different coats or crusts of a grayish, brownish, or black colour, similar to those observed on the tongue.

The *hair* frequently falls off after acute diseases, and it is stated occasionally to have undergone remarkable changes in colour, when

it appears most commonly to become white. Some affections seem peculiar to the hairy scalp; a very remarkable one has received the name of *porrigo decalvans*, where the hair falls off in patches of a greater or less extent, even in young persons, leaving a perfectly polished and shining scalp.

The *neck* varies in length and in thickness in different individuals, and formerly much was said upon the liability to different diseases as indicated by its dimensions. The short thick neck was a warning of apoplectic affections, while length of neck was looked upon as a sign of predisposition to phthisis. The former, though not in all cases applicable, has some title to attention. In some affections its size is much increased, as in bronchocele; it swells also in angina, and to a considerable degree in emphysema. In general emaciation the neck participates with the rest of the body, and this also gives it the appearance of greater length. In cases of great determination of blood to the head, the carotids may be observed to beat violently, as also in active aneurism of the left ventricle of the heart. When the right side of the heart is affected, the external jugular veins, and indeed, all the superficial veins of the neck, also, are often much distended.

The *chest* indicating a healthy state of its contained organs should be broad and well expanded. Disease may increase or diminish its size, or produce alterations in its form and proportions, and an examination of it not only enables us to observe these alterations, but also any changes which may take place in its motions, and in the parts which compose it, as any deformity consequent upon the different contortions produced by rachitis. Laennec remarks, that in very thin subjects the expansion of the lungs may be distinctly observed between the cartilages of the superior false ribs, so that, during inspiration, these parts bulge out, while they sink again in expiration. In cases where an effusion of serum or pus has taken place into the pleura, but especially in emaciated persons, we sometimes may remark, that the intercostal spaces are prominent on the side affected; and Laennec states, that if the bare chest of a patient who is affected with pleurisy, accompanied by a copious effusion, is examined, in the majority of cases, one side of the chest will be found to be larger than the other; but that this sign is very liable to deceive, since in some cases of empyema, even when it has become necessary to operate, the affected side, although full of pus, has been observed to be less than the healthy, in consequence of the absorption which has taken place, and the succeeding narrowing of the chest.

When the lungs on both sides are adherent, the chest is generally found to be much narrower than it was previously. In some cases one side of the chest is less than the other, upon which Laennec has given some very interesting remarks. Patients thus affected appear, he says, as if they were inclined to the affected side, especially when they attempt to hold themselves erect. The chest is also evidently less on that side, and if measured with a string, a difference

of more than an inch may often be found to exist between its breadth and that of the opposite side. Its length is also equally diminished, the ribs are brought nearer to each other, the shoulder is more depressed, the muscles, especially the pectoralis major, are diminished to half the size in comparison with those of the opposite side. The difference of the two sides is, indeed, so remarkable, that at first sight, it would appear to be much more than it is in reality found to be on actual measurement. The spinal column, in general, continues straight, although from the habit which the patient acquires of leaning to that side it may acquire a slight inclination. These appearances indicate that, at some period, a considerable effusion has taken place, and in all probability produced an enlargement of this very side of the chest; but that, in process of time, the lung having been compressed, could not recover its former volume, and the walls of the chest have diminished in approaching the contained organ. It has been proposed, in cases where it is suspected that an effusion of fluid and air exist at the same time in the chest, to resort to the old method of succussion as described by Hippocrates, shaking, in fact, the patient, and listening for a noise similar to what is heard in agitating a half filled bottle. This experiment is at least useless, and may prove very dangerous.

The integuments of the chest may be distended in anasarca, or emphysema. In some persons, a natural difference exists between the dimensions of the sides of the chest, independent of any disease. In those who have suffered much from difficult respiration, the shoulders are generally observed to be elevated and brought forwards.

Sometimes when a large aneurism exists, a tumour may be observed on the part of the chest corresponding to its situation. In one case which I attended, there was a large pulsating tumour at the lower portion of the left scapula, in some degree occupying its place, from which it seemed to have been pushed aside, the ribs appeared to have been absorbed, and these changes were produced by aneurism of the aorta, but not having been favoured with an opportunity of being present at the inspection I cannot enter into any detail of the appearances.

The *abdomen* varies in size in different individuals even in health, and in disease it may exhibit the same alterations, in size, colour, and temperature, as the other parts of the body, and arising from the same causes. When we find great heat of its integuments confined to that region, or at least bearing no proportion to the general temperature of the body, we may suspect the presence of some irritation in the abdominal viscera, a symptom often observed in young children.

Increase of size in the abdomen when not dependant upon alteration in the bulk of its integuments, generally arises from some accumulation of gas or fœcal matter in the intestines, from the presence of fluids, or from some enlargement in one or more of the contained viscera.

The presence of gas may generally be detected by making a gentle percussion upon the abdomen with the ends of the fingers, when it will sound tense and hollow like a drum. The inflation may be either general or partial, and to a greater or less extent. Its importance, as a symptom, varies according to the circumstances of the case; thus it may accompany slight irritation in the intestinal canal, indigestion, or hysteria, and be of little consequence; or it may be the result of considerable mischief in the abdominal cavity, or of great debility, and form a highly important and dangerous symptom. In fever, the intestines may become thus swollen and distended, and appear unable to exert their muscular action in the expulsion of the flatus or their other contents; and if in this state we succeed in procuring an evacuation, it generally appears to pass almost independently of the peristaltic action, and in no way to diminish the distension. The terms meteorismus and tympanitis, have been applied to this state of the abdomen; the latter of these is most commonly used to express a higher degree of distension, or one which has lasted for some time. Indeed, by some, tympanitis is considered virtually as a disease, while meteorismus is deemed merely a symptom; but others, again, use the terms indiscriminately, and consider both as only symptomatic.

When the swelling of the abdomen is produced by the accumulation of fluids in its cavity, we can generally detect their presence by the application of one hand to the one side of the belly, while we make several percussions on the opposite side with the extremities of the fingers of the other hand. A degree of motion is thus imparted to the contained fluid, which gives to the hand laid upon the abdominal parietes, a sensation of a fluid striking upon it. This is termed fluctuation, and is unaccompanied by any sound similar to that produced in tympanitis.

Serous accumulations are the most common, and these may be either general or only confined to particular parts of the abdomen. In females, one or both of the ovaries may be thus affected, when, as well as in some other cases, where the fluid is contained in a cyst, it is often difficult to detect any fluctuation.

Rostan observes, that in cases of ascites, he as well as other medical men have remarked that percussion upon the most prominent part of the abdomen has generally given a sound similar to that heard in tympanitis, and, therefore, he concludes that the intestines, distended with flatus, occupy a situation anterior to the effused fluid. Where encysted dropsy has existed to any degree, he has observed that the fluctuation is most apparent at the most prominent part of the abdomen; while at the sides, which are the parts most dependent, when the patient is placed on the back, the meteorismus is more readily perceived; since the tumour, being greatly distended, presses all the intestines beneath it and upon the sides. This may hold good in some cases of encysted dropsy, but not in all; since, in consequence of adhesions having formed, partial accumulations may take place in situations where this alteration in

the position of the intestines would not be produced. And where the abdomen is very much distended, the mesentery may not be sufficiently large to admit of being extended, so that the intestines shall occupy the fore part, or float, as it were, upon the surface of the effused fluid. In some cases, the distension depends both upon accumulation of serosity in the cavity of the abdomen and of flatus in the intestines, and then the fluctuation is generally most remarkable in the most dependent parts. When pus or blood, or a fluid containing much coagulable lymph is contained in the abdomen, we rarely have any decided fluctuation.

The abdomen may be only distended or increased in size in one particular part, and this may arise from enlargement in some of the viscera contained in it, or from adventitious tumours. Some of these enlargements may be recognised by careful examination; but others, deep seated, or concealed by some other cause, may elude our most accurate search. Of the difficulty of accurately discriminating the nature of abdominal tumours, I have lately had a good example, in which many of the symptoms would have induced a belief that disease existed in the liver, and that an abscess of this organ had discharged itself by an opening through the integuments near the umbilicus. At the same time, it was evident that tumours existed in the cavity of the abdomen, the situation of some of which would favour the opinion that the ovaries were also diseased. A *post mortem* examination, however, showed that the tumours were independent of both these organs, and that they were only connected with the uterus by a peduncle of cellular texture, similar to the connexions existing between the several tumours which were contained in the cavity of the abdomen.—See *Medical Gazette*, May 26th, 1838, p. 382.

The abdomen is divided, by imaginary lines, into several regions. Thus if we suppose a line encircling the trunk, at the bottom of the chest, as high as the ensiform cartilage, another passing under the false ribs, a third passing upon the cristæ of the ossa ilii, a fourth at the level of the pubis, we shall then have three horizontal bands of three or four inches in breadth. The first of which is called the epigastric or præcordial region, the second the umbilical, and the third the hypogastric region. If we again draw two imaginary lines, to fall vertically upon those already supposed to be described, and so as to divide them into three equal portions, we shall then have these regions divided into nine parts of nearly equal dimensions, three of which will occupy the middle of the abdomen, and three each of the sides. These divisions of the regions have each received different names. The middle part of the epigastric region is called the epigastrium, and the lateral parts the hypochondria; the lateral parts of the umbilical region are called the lumbar regions, while the name of hypogastrium is given to the middle of the lowest division, and its sides are called the iliac regions. Anatomy acquaints us with the organs situated in each of these, and enables us often to decide upon the probable seat of any tumour

which we meet with in the abdominal cavity, especially if we find the function of that organ also impeded. But we may be deceived, or encounter difficulties, in consequence of a change of position of the viscera, produced by disease. Thus, in cases of schirrus pylori, the stomach often occupies a much larger space in the abdomen than natural, and the characteristic tumour is felt low down in the right hypochondrium. Cruveilhier (art. Abdomen, *Dict. de Médecine et de Chirurgie Pratiques*, 1829), describes accurately the parts contained in the different regions, but observes that "each viscus may in its turn occupy a more or less considerable part of the cavity, and displace all the others which are near to it, so as always to correspond to the walls of the abdomen: as the gravid uterus, the ovary in encysted dropsy, the liver in the numerous enlargements of which it is the seat, the spleen, the large intestines, the sigmoid flexure of the colon, in cases where its contents are retained, either in consequence of imperforate anus or of obstinate constipation; and it often happens that when the viscera have undergone, for any considerable time, these displacements, or great pressure, that they never again resume exactly their former situation." Changes in the attitude of the patient have also some influence; and we must not be deceived by the recti muscles, which will sometimes give the feeling of a tumour, or succession of tumours, by their contractions. In our examination, we should be careful, and regard not only the situation, but the form and size of the tumour, its degree of consistence, its mobility, the degree of pain or uneasiness produced by it, or by any pressure upon it. If it is situated in the region of any of the large vessels, we also ascertain if it pulsates; and, under all circumstances, we must bear in mind the effect produced upon the functions of the parts.

M. Piorry has proposed the application of a thin plate of ivory, or box-wood, or any other hard elastic body, over the part to be examined, and then striking upon it. The pleximeter, as it is termed, or measure of percussion, may be about two and a half or three inches in diameter; and has the advantage of protecting the part upon which it is placed from any unpleasant sensations, arising from the percussion, and of assisting the production of the sound which we wish to obtain. If this instrument be placed over the liver, percussion gives a dull sound,—since a dense body is beneath that part of the abdominal parietes; if it be placed over the stomach or intestines, a sound will be produced, clear in proportion to the quantity of air contained in these viscera. M. Piorry, in his work on this subject, applies it for the purpose of detecting disease in the organs contained in the abdomen,—to ascertain, for instance, the extent of an enlarged liver or spleen, ovarian diseases, tumours of different kinds, disease of the stomach, in which, he says, we may suspect organic disease when the sound is dull, at a time when the stomach must be empty of food.

Auscultation has been used, and advantageously, in ascertaining affections in the large vessels of the abdomen; and has lately been

applied by M. Kergaradec, to ascertain the existence of pregnancy; and by M. Lisfranc, the presence of stone in the bladder.

A great diminution may take place in the size of the abdomen; sometimes in the course of chronic diseases and attendant upon general emaciation, but occasionally more rapidly, and to so great a degree, that the abdominal parietes seem pressed upon the vertebral column,—as in the colic, produced by lead, or where a patient is greatly reduced by excessive evacuations from the bowels. This is often seen remarkably in hydrocephalus. Generally, the degree of resistance afforded by the parietes is in proportion to their distension; but, occasionally, great hardness accompanies diminution in size.

The form of the abdomen is also important. In ascites, the swelling is generally uniform, and appears to extend equally over the abdomen; the fore part being, however, the most prominent, and sometimes when the distension is very great, the umbilicus is protruded, so as to appear like a small prominence upon a half globe. When œdema occupies the parietes, the flanks are very much swollen. But often, a great change is produced by change in position,—thus the belly falls to the side on which the patient reclines. In cases of encysted dropsy, or of tumours, existing independent of ascites, the abdomen may assume an irregular shape.

The *genial organs* are the seat of the primary symptoms in syphilis; and frequently from irritation, as from calculus in the kidneys or bladder, from inflammation of the mucous membrane of the bladder, &c., we have painful affections of the male organs. Thus, in nephritis, the testicles are often forcibly retracted, and pressed against the ring. The cellular texture of the scrotum is sometimes much distended in anasarca, and the scrotum itself may, also, be much enlarged, in consequence of serous accumulation in the tunica vaginalis, or from hernia. In that affection of the parotid glands, termed mumps, a metastasis will occasionally take place, the swelling disappearing suddenly from the parts which it first occupied, and affecting the testes. The cellular texture of the scrotum, pubis, and perineum, may also be much distended by an infiltration of the urine, in cases where the continuity of the urethra has been broken, and this is followed by a high degree of inflammation, and often by gangrene. An erysipelatous affection may attack the genial organs of both sexes, especially in infancy. The female external organs become swollen in œdema, and violent pains often extend from the loins or pubis, to the groin or thigh, in affections of the uterine system.

The *limbs*, independent of any change in their motions, exhibit alterations in their external appearance; and, besides, general causes which change the colour, volume, and temperature of the whole body, some particular circumstances appear to operate on the extremities solely. Thus, compression exerted for some time upon a limb, will cause it to swell. In dropsical effusion into one side of the chest, it is stated, that the corresponding upper extremity

will often become œdematous, which may, perhaps, in some degree be accounted for, by the usual attitude of the patient, in this disease. In all chronic affections of the chest and abdomen, these partial swellings are said to presage the approach of a fatal termination. In dropsical affections, in any great enlargement of the liver, sometimes from pressure of the gravid uterus, and often from mere debility, the lower limbs become œdematous. At first, a slight swelling appears about the feet and ankles towards night, which subsides, by rest, before morning; and it may go on in this way for some time, when it begins gradually to increase and advance, until the whole limb is affected. But the limbs may exhibit more partial swellings than these, as at their joints, in rheumatism or gout, or in their fleshy parts from abscess, aneurisms, &c. Diminution in the size of the limb may also take place, as happens generally in paralysis; and when this affects a child, the limb does not grow in length, in the same proportion as the other, so that after some years, it may be observed to be shorter than its corresponding extremity.

Diminution of the temperature of the extremities may be the effect of exposure to cold, or it may accompany a shivering fit, and soon go off again; when, however, it comes on, and lasts for any time, in the course of an acute disease, it argues a deficiency in the powers of the system, more especially, if the patient at the same time complains of heat and thirst, or if the colour of the limbs become pale or livid, or leaden coloured.

Uneasiness and pains in the limbs often precede the attack of acute diseases; but some painful affections seem to attack them, in preference to the other parts of the body, although they cannot be considered as peculiar to them,—as rheumatism or gout, which most commonly affect the feet or hands. Syphilitic pains often attack the long bones, especially those of the legs.

The appearance of the *hands* and *fingers* is sometimes worthy of remark. Great emaciation or plethora are often shown in them. In scrofulous persons the joints of the fingers are generally enlarged. In gout we find them to be the seat of a peculiar deposit called chalk stones, producing great deformity and impeding or even preventing motion. M. Beclard remarks that the fingers of children affected with aneurism of the heart present a remarkable appearance, the extremities are much larger than the rest of the fingers, so that they resemble small clubs.

The *nails* do not appear to possess any high degree of vitality, yet they exhibit several interesting diseased appearances. Sometimes they become very thin or very thick and stunted, looking like horn and occasionally curved or twisted. They sometimes are thrown off, as after a contusion, or as a kind of fungous growth springs up beneath them. In the febrile shivering, the nails become pale or blueish; and in some affections of the heart and large vessels, or of the chest, they become livid and appear almost black. In phthisical patients, a peculiar curvature may be often

observed in them (*ungues aduncati*), they become elevated in the centre, and appear as it were to enclose the extremity of the finger. This has been attributed to diminution in the soft parts by absorption, but the fingers often look broader than natural at their extremities.

SYMPTOMS OBSERVED IN THE MOTIVE POWERS.

The organs concerned in the production of muscular motion may be divided into those which are passive, and those which are active. The former of these form the solid frame work and support of the body, and by their solidity afford the other, or flexible and contractile organs, points of insertion and support for the performance of those actions, by which they effect the different motions dependant upon the will.

The *bones*, or passive agents, are liable to injuries peculiar to themselves; thus they may be fractured or luxated, by either of which accidents the action of the muscles would be prevented from producing their regular motions. They may become deformed, softened, or curved in different ways, their cartilages may suffer disease and render motion painful, or the joints may be ankylosed, when all motion is prevented, not only such as the will could otherwise have effected, but even any attempt to produce it in the part will be fruitless. But the *muscles*, the active agents in the production of motion, furnish us with a variety of phenomena of great interest and value. Any great increase in the muscular force is rarely seen except in maniacal cases; it may, indeed, occur in a less degree in some diseases which are termed nervous, as hysteria. The most common changes, however, consist either in the decrease, in the absolute loss, or in the perversion of the muscular power.

The greatest number of acute diseases, as well as diseases of long standing, and excesses of all kinds, appear to diminish it; and although this may at first only amount to a degree of weariness and consequent desire to avoid any muscular exertion, it may go on to such a degree of weakness, as will incapacitate the patient from performing any muscular exertion. He lies motionless, and if any of his limbs be raised, they fall again without any effort on his part. He neither moves nor turns in bed, nor is he able to assist himself even in the prehension of food. Every degree from simple lassitude to absolute prostration of strength, may be observed in different cases. In some the forces are actually diminished or exhausted, as, for instance, after long and serious diseases, after great evacuations, as large hemorrhages, or from deficiency of nourishment, while in others they are merely depressed by some cause, which if we can succeed in removing, we at the same time remove altogether, or at least materially alleviate, this depression. When real *debility* exists, it will remain even when the cause which has tended to induce it, is removed, and will only be relieved by such means as are suited to produce greater strength and energy in the body.

It is generally, too, the result of a cause which has operated for some time, or whose evident effect would be the production of debility. Whereas *depression* of strength may be induced quickly, and often in consequence of a cause, whose operation does not seem calculated to produce debility. Thus an error in diet, as an overloaded stomach, may produce it; the person feels languid, listless, and unfit for exertion, and sometimes even appears as feeble and weak as one really debilitated; but this state will generally go off rapidly, as soon as the contents of the stomach are discharged. Depression may be observed in the diseases of robust people, and would seem to be occasioned by causes the very opposite to those which produce debility. Thus a man who indulges his appetite without reserve, and without proper attention to exercise and the state of his *egesta*, will often experience it. It may be observed, too, at the commencement of many acute diseases, and even in cases where the patient would appear, instead of wanting strength, to be as it were rather oppressed by an excess of it. We may always suspect it when we see the powers diminished to a degree which bears no proportion to the cause, and when this state has come on quickly and increased rapidly. The period of the disease, too, at which it has come on may assist us in deciding whether the patient labours under debility or depression; for we rarely meet with true debility, at the commencement, in those who have previously enjoyed a good state of health, or who have not been exposed to any debilitating cause. This is a distinction of considerable importance, since we can frequently judge of the danger in which a patient may be, by estimating the effect produced upon his strength, and in some cases, which may not in themselves be severe, the debility induced by the disease forms the most important symptom. Thus an attack of fever may be slight, and unattended by any marked or dangerous symptom, yet such a degree of debility may accompany it, or remain after all the other symptoms are removed, as may induce us very much to fear the result.

We must be careful to discriminate, too, between debility and *weariness*. A patient may feel fatigue after any violent pains, after spasms or convulsions, loss of rest, &c., and this may go off completely after repose. In a person much debilitated this fatigue may be attended by serious consequences, and in such a state all exertions capable of inducing it should be carefully avoided; and even in health, that degree of exercise which falls short of producing it, will generally be found the most beneficial.

When the muscular contractility is completely, or in a great measure destroyed, or lost in any part, so that it is rendered unable to perform any motion, this state is called paralysis.

This may occupy the body generally, as in apoplexy or coma; or it may effect only one side, when it is termed hemiplegia; or it may affect the lower extremities and parts of the body, on both sides, when it is named paraplegia. A variety is described, but as

being very rare, in which the arm of one side and the leg of the other, as the right arm and left leg, are paralysed. But we frequently meet with more partial paralytic affections, so that, in some instances, only a few, or even a single muscle will be affected. In a species to which painters are liable, we find the thumbs, especially that of the right hand, or the wrists paralysed. The bladder may be affected, or the sphincter ani. The power of closing the eyes may be lost in one or both, or the muscles of one side of the face, or of an arm, or of a leg may be paralysed, and generally where the power of motion is lost, the sensibility is also lost, or much impaired, although this is not always the case, for either may be affected singly. Thus, according to M. Landré Beauvais, the celebrated Condamine lived many years with a complete insensibility of his hands, and yet he could execute all the movements of the parts.

A variety of occasional causes seem capable of exciting paralytic affections, or rather of inducing some changes or alterations in the nervous system, producing this effect upon the muscular power. Some of these can be recognized by careful examination after death; but many of the causes which produce partial paralysis are very obscure, and some of these paralyzes are only temporary. Indeed, in many instances no morbid appearances can be detected, or only such slight ones as would seem quite inadequate to the production of the disease, a slight blush of redness, or a very small and partial effusion, even in cases where the paralysis has occupied nearly the whole of the body. If we must consider paralysis as, in all cases, a symptom of some organic affection of the brain, spinal cord, or nerves, we shall often fail in our attempts to discover the particular part affected. This may probably be owing to our imperfect knowledge of the nervous system, notwithstanding the great attention which has been devoted to this subject. When the affection is general, says Rostan, it is the sign of some injury affecting the brain generally, or in a central part, or it indicates a local injury so extended that it produces its effects upon both sides. Thus it may be the effect of apoplexy or congestion, or of an effusion of blood into one lobe of the brain, which extends into the ventricles and compresses the other and healthy side of the brain, when the paralysis is always more complete on one side than on the other, and generally at first appears only on one side. When the affection is partial, we may suspect some local and circumscribed injury of the brain, situated in the side opposite to that affected. But he adds, the seat of the injury which produces paralysis is not always in the brain, for it may depend upon compression of a nerve from a tumour in its course, upon some peculiar alteration in the nerve itself, upon the want of a due circulation of blood in the limb, &c. In deciding the cause, much, also, depends upon the mode of the attack, and the progress of the disease.

Many cases which before appeared singular and anomalous, are explained by the valuable discoveries of Sir C. Bell, which prove

that, the nerves of sensation and motion being separate, each of these faculties may be singly disturbed, while many sympathetic affections are simplified by the knowledge of the influence of the respiratory nerve. Similar success, it is to be hoped, may follow the labours of others in their accurate examination of the brain and nerves; but we may naturally suppose, that many disturbances may take place in the nervous system, which will, probably, always elude explanation. The mode in which it performs its healthy functions, is only known to us in its effects, and, although, by interrupting its continuity, we can destroy voluntary motion in any part, we are still unable to explain, how the nervous substance acts, or what peculiar states of it may render it unfit for the transmission of the powerful influence attached to it.

The muscular powers may be perverted in their motions, and exhibit a great variety in their altered contractility from slight tremor, to violent convulsions.

Tremor consists of a slight and involuntary agitation of a part, and appears to consist in a very rapid succession of contractions and relaxations of the muscular fibres. The strong and healthy action of the muscles, gives the idea of a single contraction being employed for the production of any effect; but in reality, it consists of a number of contractions and relaxations so rapidly following each other, and so slightly performed as not to be perceptible to the senses. If, however, we desire a vigorous man to extend his arm, directing him, at the same time, to hold a long slender stick horizontally, we can, by observing its extremity, remark these alternate contractions and relaxations producing a vibratory motion in it. These will be much more perceptible in a debilitated person, or in one whose muscles possess little of that inherent permanent contraction, which is termed tone, and by which they are always kept in a greater degree of tension, during life, than they possess in death, and, indeed, in some they amount to tremor.

When any muscle contracts suddenly, and produces a quick motion in its tendinous extremity, independent of the will, this is termed *subsultus tendinum*. This is often felt, particularly in examining the pulse, at the wrist, and may be considered more or less dangerous in proportion to the violence with which it occurs, and the symptoms which accompany it.

Convulsions, or *spasms*, consist of involuntary and preternatural contractions, and are divided into those which alternate with relaxation of the contracted muscles, or with the contractions of other muscles, when they are termed *clonic* (*spasmi clonici*); and into those where the contraction is permanent, and where the parts affected become tense and flexible, so that the patient is unable to use them, nor can any external force overcome it, and these latter are named *tonic* (*spasmi tonici*). These convulsions may be general, or only partial, in some cases affecting all the voluntary muscles, in others, confined to a few. In tonic spasm, when all the muscles are equally affected, so that the patient lies extended and

motionless, this state is called tetanus. If the contraction is confined to the muscles, on the anterior part of the body, so that it is bent forward, it is named *emprostotonos*, but if, on the contrary, the body is bent backward by the firmer contraction of the muscles of the back, it is termed *opisthotonos*. But the tonic spasm may be confined only to particular parts; thus, when the muscles concerned in moving the jaw are affected, we have *trismus*, and when the muscles of the face are its seat, we observe the *risus sardonius*. A degree of tonic spasm affects the muscles, most commonly, of the legs or feet, which, although it may only remain for a short time, yet during that time, is permanent, and accompanied by great pain and rigidity in the parts, and is called *cramp*. This may come on in persons enjoying good health, and even upon very slight causes, as fatigue in walking or dancing, or upon exposure of the feet to cold. That violent and distressing disease, tetanus, may be produced by a variety of causes, and in the warmer climates, it may follow apparently trifling sources of irritation, but in this country it is, most commonly, the consequence of some external injury or wound, and forms the species, named *traumatic*.

A difference has been made by some, between the terms, spasm and convulsion, and the former has been applied to the continued, and the latter to the alternate contractions of the muscles. *Gaubius* terms spasm, a violent, inordinate, and involuntary action of the motive fibres. And *Dr. Cullen* defines *spasmi*, as "*musculorum vel fibrarum muscularium motus abnormes*," by which he intends that the motions must be considered inordinate, inasmuch as they arise from preternatural causes, or as they are immoderate in the violence, frequency, or duration of the contraction.

Under the head of spasmodic, or convulsive diseases, are arranged a great variety of affections, varying much both in their degrees of intensity and importance, and with the real pathology of many of which we must confess ourselves to be unacquainted. Between even a slight degree of tremor and a strong convulsion there is some connexion, so that they may be considered as extreme points of the same chain. The catching at the bedclothes, and imaginary objects (*muscus volitantes, floccosque colligens*) which accompanies some diseases, is referred by some modern writers to a convulsive affection of the flexor muscles. And *Gaubius* considers, that "*Inquietude* may, likewise, in some measure be referred to this head; for, although that agitation of the members does not happen altogether against the will, for the most part, however, it cannot be suspended at discretion when it arises from disease."

The same convulsive diseases often exhibit great anomalies. The variety of forms under which *hysteria* may show itself, "*quam nec Proteus lusit unquam, nec coloratus spectatur chamælion*," render its history and real nature very obscure. In *epilepsy* and *chorea*, we meet with great differences in different cases, and we find these, as well as convulsions, arising from a great variety of causes, which would seem not calculated to produce one general effect, to

which we might refer as the real cause or state upon which the disease always depends. Severe convulsions may be produced by slight causes of irritation, which yield readily upon the removal of the cause, while very slight convulsive motions may be connected with serious and irremediable changes of structure.

Spasm is not confined to the external, but may affect, also, the muscular fibres of any internal organ. Thus, the stomach, the intestines, the diaphragm, the heart, &c. may be affected; to this cause is referred the vomiting and sobbing in hysteria, the forcible ejection of the urine and fæces which takes place sometimes in epilepsy, &c.

A very singular affection is described under the title of catalepsy, in which the patients retain the position in which they may be at the time of the attack, or in which they may be placed by others, however uneasy and inconvenient this may be. Beauvais states, that it is sometimes seen in hysterical and melancholic persons who fall into stupor. The hospital of Salpêtrière is said to have offered many examples where the termination has been favourable, although tedious. Chomel mentions a case, where it came on every second day, in an insane female, and he considers that it chiefly occurs in hysterical patients. He once saw a case, in which the patient always preserved the same position in which he happened to be at the period of his attack, his limbs yielded to any external impulse, but resumed their former position as soon as this ceased. In most instances, no doubt, catalepsy is a feigned disease, and it is doubted whether, in reality, any such affection does exist.

In chorea, a singular effect may be observed. The patient experiences sudden shocks in his limbs, when he wishes to remain still and quiet, and when he attempts to execute any motion, two sorts of almost opposite actions may be remarked. He wishes to extend his hand, or foot, and makes a voluntary effort for this purpose, when another involuntary and irresistible action takes place, and in some degree checks the former effort, so that he makes many contortions, and moves his limbs in an irregular and circuitous manner.

Gaubius remarks, that it will sometimes happen, that the muscles regularly excited into action in obedience to the will, may afterwards, by an involuntary agility and impetuosity not to be restrained, accelerate their motions, and hurry away against the determination of the will; a vitiation frequent in the muscles of speech, but not, however, peculiar to these alone, for he has seen those who could run, but not walk. And we occasionally meet with persons who can execute regular movements, when they perform them with rapidity, which become imperfect or irregular, when executed slowly.

Motion is sometimes impeded, or prevented, in consequence of contractions, or a permanent and chronic rigidity in the flexor muscles, which diminish in length and breadth, at the same time, that they become tense and hard.

SYMPTOMS OBSERVED IN THE VOICE AND SPEECH.

The alterations which take place in the voice and speech may arise from affections of the organs concerned in their production, or from sympathy with some other organs. They serve also, in some degree, as a measure of the general strength. There is rarely any increase in the strength of the *voice*, though in some cases of delirium the patients utter loud cries, but in the generality of diseases it becomes weaker than natural, and in some it may be entirely lost. The term *voice* is applied to that appreciable degree of sound which the air produces in traversing the glottis; and it may vary much in tone in the affections of the organs concerned in its production, as in cases of nasal polypi, in affections of the tonsils, or where any injury has occurred in the palate or roof of the mouth. In croup, it becomes shrill and crowing, and has been compared to the sound produced by a cock crowing; in laryngitis, it is shrill and hissing. A degree of huskiness or hoarseness may be produced by many causes, in some persons by very slight ones, as exertion in speaking. It is often remarkable in persons addicted to spirituous potations; and cases may be observed of a very tedious and distressing hoarseness not easily accounted for, but in some connected apparently with a debilitated state of the organs. The complete loss of voice (*aphonia*), says Chomel, must not be confounded with another state (*mussitatio*), in which the tongue and lips move as for the articulation of words, and yet unaccompanied by any, or so slight a sound as to be scarcely audible. This sometimes precedes complete aphony, and is often observed in fever cases where the brain is affected, and also in some nervous diseases. Dumbness is also a different affection, and consists in the incapacity of forming articulate sounds, and of speaking. Aphony is a necessary consequence of paralysis of the muscles of the larynx, and often accompanies hemiplegia, and precedes or follows apoplexy. In some cases it would appear to be intermittent: thus Rostan relates one in which the loss both of voice and speech occurred periodically in a female, in whom it had first been induced by terror. The voice becomes languid, weak, and almost inaudible, in diseases attended by great debility.

The *speech* or power of articulate utterance, or of expressing thoughts by words, or vocal sounds, may undergo changes, some dependant on the state of the voice, and others unconnected with it. Thus in some cases we meet with a degree of hesitation or tremor, in others with great rapidity or volubility of speech. Portal mentions a case of a female who commenced speaking with difficulty, but as soon as she had succeeded in uttering the first words, she seemed unable to restrain herself from expressing every idea which was passing in her mind, the voice alternately and quickly assuming a grave or an acute tone.

Loss of speech may be independent of any loss of the voice, as

when the muscles of the tongue are alone affected, occasionally it may be a spasmodic affection; thus hysterical females are sometimes unable to speak during their paroxysms. Whenever it is accompanied by signs of great debility, it forms an unfavourable symptom. Alcoholic and narcotic preparations sometimes produce it: thus Sauvages mentions a case where, after drinking wine in which the seeds of stramonium had been infused, the individuals did not recover the power of speech for two days. The berries of atropa belladonna and the root of hyoscyamus niger will produce a similar effect.

Laennec, in his investigations into the diseases of the chest, has extended *auscultation* to the examination of the voice, as furnishing certain indications, which may be ascertained either without or with the assistance of the stethoscope. If the hand is applied to the chest of a healthy person, when he speaks or sings, a degree of tremor may be felt over its whole extent. And if the ear be applied under similar circumstances, but particularly if it be assisted by the stethoscope, a confused sound is heard, which varies in intensity in different parts of the chest, but is most evident in those which are the least covered by fleshy integuments. The parts, therefore, in which it can be heard most distinctly are, the axillæ, the anterior and superior part of the chest, near the angle formed by the union of the sternum and clavicle, and on the back, between the internal margin of the scapula and the vertebral column. This sound varies in different individuals according to the tone of their voices; thus when this is grave, it is stronger, but dull, confused, and almost the same in all points of the chest, whereas it is clear and very distinct in those who have a sharp-toned voice, as in females and children. A trembling and agitated voice is only feebly heard, and in aphony the sound is altogether wanting.

The chief changes produced in this sound by disease, are described by Laennec under the names of *pectoriloquism* and *ægophonism*.

Pectoriloquism consists in the voice appearing to come sufficiently distinct from the point upon which the stethoscope is applied, and to pass through the centre of the tube directly to the ear. A perfect idea may be formed of this by applying the instrument to the trachea of a healthy person while he speaks, sings, or coughs, when the voice will appear to come strongly through the tube, and prevent the observer from hearing that which proceeds from the mouth, with the other ear. This effect may extend all along the sides of the neck, and even occasionally be heard in the nucha, so that as the base of the neck is approached, this laryngeal or tracheal sound may be heard, and mistaken for a sign of disease at the summit of the lungs. *Pectoriloquism* is said to be *perfect* when the voice appears to come clearly and well articulated, and to pass through the cylinder and arrive at the ear of the observer either with its natural or a stronger tone; while it is *imperfect* when the voice sounds forcibly under the cylinder, and appears to approach

the ear without traversing the whole tube; and it is *doubtful* when the sound is very weak, and does not seem to pass through the tube.

It is considered to denote the presence of a cavity accidentally formed in the lung, communicating freely with the bronchi, and more or less completely empty. It varies in some degree according to the tone of the voice, the size of the excavations, their form, the firmness or softness of their walls, their proximity to the walls of the chest, and to the facility or difficulty with which the air penetrates into them. In proportion as the cavity contains less fluid, so much the more evident is the pectoriloquism, since the communication with the bronchi is then generally large and free. Sometimes it is observed to intermit for a time, and this may be accounted for by supposing that an impediment has taken place to the free communication with the bronchi, frequently occasioned by a stagnation of the matter to be expectorated in these tubes. Rostan and others remark that pectoriloquism may exist in cases where no cavity is present capable of accounting for it, and they then attribute it to condensation of the lungs, which are thus rendered more capable of transmitting the sound which the air produces in traversing the bronchial tubes; and especially if, as M. Colin says, the portion thus condensed is near the *aspera arteria*, or in contact with it, or traversed by large bronchial tubes.

Laennec speaks of a sound to which he gives the name of *bronchophonism*, heard in those subjects, particularly children, whose muscles are thin at the superior internal angle of the scapula, and which may occur accidentally in persons where the pulmonary texture has become denser, as by the existence of a great number of tubercles, by the accumulation of blood, by dilated bronchi pressing upon it, and rendering the spaces between them more compact and less permeable to air. In these cases the sound rarely amounts to pectoriloquism; it generally does not traverse the cylinder, is more diffused, appearing to extend over some distance, and having some resemblance to that produced by the speaking-trumpet.

Ægophonism consists in a particular sound of the voice, accompanying or following the articulation of the words. It seems, says Laennec, that a voice more shrill and sharp than that of the patient, and in some degree silvery, trembled or vibrated at the surface of the lung. It appears rather an echo of the voice than the voice of the patient; it rarely enters the tube, and scarcely ever traverses it completely: but it has one constant character in being trembling and interrupted, and resembling that of a goat in its tone.

This varies much in its extent and intensity, and was thought by Laennec to be occasioned by the agitation produced on the surface of a fluid contained in the chest by the vibrations which the voice occasions, and if the effusion was to any great extent, or only very slight, it was not to be heard. He considered it as rather a favourable sign, as it indicated only a slight effusion, and that it was very difficult to establish it by inspection, since most cases in which it

occurs recover. More lately he attributed it to the flattening of the bronchial tubes; but as these are not naturally cylindrical, says M. Collin, it is very difficult to ascertain this, and perhaps a very slight narrowing of these tubes may give rise to ægophonism.

SYMPTOMS OBSERVED IN THE ORGANS OF SENSATION.

The different parts of the body possess *sensibility*, or the power of receiving certain impressions made upon them, which being conveyed to the brain are perceived by it. We are provided with organs, admirably adapted by their peculiar structure, for this particular purpose, and which enable us to ascertain correctly the conditions and qualities of external objects. In addition to these special organs, there is in certain parts a degree of sensibility, which as Gaubius says, "warns us of the necessities of nature, and when occasion requires, compels us to satisfy the same."

The sensibility varies in different individuals, being in some naturally very weak, in others very acute. It appears, also, to vary in the two sexes and at different ages, being considerable in infancy and youth, and active during the period of manhood, from whence it begins gradually to decline, until, in very old age, it often appears incapable of being acted upon, by the impression of ordinary causes of sensation. Repetition of the impressions seems, also generally, to diminish their effects, and the facility with which they are received. But independent of such causes, the sensibility may be much affected by disease. Thus, in some it is much increased, as at the commencement of many acute affections, but especially of those in which any cerebral excitement exists, as well as in some more chronic diseases referable to the nervous system: in others, a great diminution of it takes place, as in cases of compression of the brain. This change is sometimes confined to a particular part, and although we often find the mobility of the part affected, at the same time, yet this, as I have before observed, is not a necessary consequence; since the sensibility may be affected, independent of any diminution in the motive powers, and these may be lost when the sensibility remains entire. Thus, Ramazzini mentions a case where he effected a cure of a paralytic, in one of whose legs the power of motion was lost, although sensation remained perfect, while in the other, the sensibility was lost, the motive power remaining entire. These cases, formerly so perplexing, are now explained by the discovery of nerves possessing separate functions.

Pain is considered a peculiar affection of the sensibility, and often forms a valuable symptom. It is unnecessary, says Petit, to explain what pain is, since every person has experienced it. Upon many diseases it is an inseparable attendant, and its occurrence often first induces a suspicion of their existence. It will often point out the particular part affected, and, by its character, enable us to decide upon the nature of the attack. In some cases, parts naturally

endowed with little sensibility become highly sensible and painful, and although generally, the degree of pain is proportionate to the degree of sensibility possessed by any part, so that a slight affection will produce acute pain in a highly sensitive organ, yet a cause may go on operating for some time, acting gradually, and producing slow, but material changes, unaccompanied by pain even in parts in which we should not have expected its absence. The causes capable of exciting pain vary in different parts, so that any irritation which would produce a high degree of it when applied to one part, may operate upon some other without producing any such effect. Whenever we find any affection existing which, under ordinary circumstances, is attended by pain, and yet none is complained of, we may suspect that the brain is, in this case, more or less affected, or that some cause operates to prevent the free connexion with it, and its consequent perception of it. A great difference exists in the character of pain, but in general we are compelled to judge of it from the account given by the patients themselves, which may often mislead us, since people differ materially in their tolerance or impatience of it. The effect which it produces upon the part, and upon the general system, must be attended to; thus in a muscular part, the patient may be unable to use it, it may produce loss of sleep, and when very acute, may produce great irritation or delirium. Pain will often vary under different circumstances; thus it may be increased or diminished by the application of cold or heat, by external pressure, &c. It has received different names according to its character; as, for instance, it is denominated *tensive*, when accompanied by a sensation of distension in the part; of this kind is that felt on making extension in a limb for the reduction of a dislocation; it is also felt in inflammations, and in parts in which abscess is forming.

Heavy or *dull* pain is accompanied by a sensation of weight, and is often felt when accumulation of fluid takes place in the cavities of the body, or when any viscus is distended by congestion of blood; thus, in inflammations of the parenchymatous viscera, the pain felt has often this character; females, too, are apt to experience it in the back and loins at the catamenial period; and in hæmorrhoidal affections it is perceived in the rectum.

Lancinating pain principally occurs in parts liberally supplied with nerves;* it seems to shoot or dart, sometimes in an excruciating manner, and appears isochronous with the pulsations of the arteries. A degree of it which may be called *pulsating*, is felt in inflammations, indicating a tendency to, or the commencement of suppuration.

Burning pain gives the sensation of great heat in the part; it is felt in some inflammations, particularly of the skin, as erysipelas. Many other varieties might be enumerated, as a *tearing* pain, as

* A marked exception to this position is seen in inflammation of the serous membrane, especially in pleurisy.—*Edit. Lib.*

felt in some cases of rheumatism, a *smarting* pain, &c. But the character may change with the progress of the disease; thus in phlegmon, at the commencement it is tensive, then pulsating, and dull and heavy, when suppuration has taken place. Its duration also varies, and it seldom continues equally severe, generally remitting in some degree, or being marked by intervals of ease. When it is very acute, it is often less durable; thus in gout, the most acute paroxysms are frequently observed to be the shortest. In some cases, pain will cease and reappear after certain intervals, as is often the case in neuralgia. Rheumatic pains, too, will sometimes, when in a chronic form, cease entirely during the day, and come on only towards night. In some instances, pain may be felt over all the body at once, or over different parts in succession; in others, it is confined to a single part. Its intensity, even allowing for the difference of manner in which patients bear it, is often not proportionate to the violence or danger of the disease, some very dangerous affections being accompanied by a slight degree of it. Whenever, in inflammation, a sudden cessation of pain takes place, not readily accounted for by the operation of our remedies, we have reason to fear the approach of gangrene. The occurrence of pain in a part is sometimes a favourable symptom, as in paralytic limbs, especially when it is accompanied by any degree of perspiration.

Its seat generally indicates the organ affected, but it may be sympathetic, and situated at a distance from the part affected; thus, pain in the right shoulder may accompany diseased liver, severe headache may be occasioned by disordered stomach.

Nearly allied to pain is another very distressing sensation which is termed *anxiety*, and which consists in an uneasiness or restlessness, or even such an excessive degree of agitation, that the patient cannot rest in any position, but is constantly changing it, unable to find ease, or remain long in any place or attitude. This may be produced by an affection of the mind, which may figure to itself imaginary evils, which it is anxious to avoid. But in other cases, it may be the effect of some slight bodily ailment, especially in persons of great irritability, who cannot bear even a slight pain with any degree of calmness. In these cases, we can sometimes succeed in allaying it by engaging their attention, or by inducing them to make exertions against it, but in some instances, no reasoning has any effect, and it becomes a troublesome and even dangerous symptom.

But a real and irresistible degree of anxiety attends some diseases, especially where any impediment exists to the free circulation of the blood, as in affections of the heart and large vessels, or the respiratory organs. It sometimes precedes the occurrence of evacuations or hæmorrhages, or delirium. As death approaches, a high degree of it is sometimes observed, accompanied by great weakness of the pulse, and by laborious and uneasy respiration.

Indeed, anxiety may accompany a variety of diseases, and may,

in some, be attended by little danger, while in others, it may form a very formidable symptom, and in all it deserves our attention. For, although at first slight, and produced by slight causes, it may go on increasing to an alarming degree, especially in irritable persons, and whenever we meet with it in those who cannot be considered liable to be thus readily affected, we have every reason to fear some serious cause for its occurrence.

EXTERNAL SENSES.

The disturbances which take place in the action of the external senses may depend upon an altered state of the organs themselves, or may be symptomatic of an affection of the brain, or of some distant organ.

Vision may be affected in a variety of ways; the chief of these may, however, be classed under increased or diminished sensibility of the eyes, or complete abolition or deprivation of the powers of sight.

The eyes may become very sensible, so as not to bear even a very feeble light without great inconvenience or pain; and this intolerance of light may be, in some instances, so great that the patient cannot be induced to open them except in a situation from which the light is excluded, as happens in particular inflammations of the eyes, and in inflammation of the brain and its membranes. In other cases their sensibility is much weakened, and occasionally quite lost; this may happen in the course of affections which have induced great debility, or in various nervous affections, and sometimes as symptomatic of derangement in the *primæ viæ*, and yielding readily to appropriate remedies. Of course every gradation, from slight imperfection to complete loss of sight, may be produced by disease in the several parts of the eye. The vision may also suffer many perversions, so that objects may appear under forms and colours which they do not possess. Patients sometimes complain that they see flashes of light, or small dark spots, or mists, or films floating before their eyes, and occasionally that all objects appear double. In vertigo, every object seems to turn round or be unsteady, and the patient appears to himself to be unsteady. It has been divided into simple vertigo, where there is only present this sensation, and into the vertigo caligenosa, in which the patient not only conceives that every thing turns round, but his sight becomes obscured as if by a cloud, and he falls down, generally suffering at the same time more or less palpitation of the heart. Vertigo may depend on many causes, and form a symptom of more or less danger, in proportion to that on which it depends. It frequently attends upon debility, upon indigestion, upon various nervous affections, while in other cases it is evidently connected with disease in the brain, or with plethora.

The *hearing* may undergo similar changes, so that it may

become too acute, perverted or dull, or entirely lost. Thus in acute inflammation of the brain, the slightest sound is intolerable to the patient. In some cases they complain of a variety of noises which do not exist, as of bells ringing, or drums beating, or a rushing wind; this is termed tinnitus aurium; and although it may accompany many serious diseases, yet it may also be produced by slight causes, as indigestion; but whenever it is constant it is in all probability dependant upon determination of blood to the head.

Deafness may arise from disease in the several parts of the ear, but this is often obscure from our inability to ascertain what particular part is affected. When it depends upon accumulation of the cerumen, it is easily relieved. It may appear in the course of other diseases; thus it frequently attends coryza, in consequence of the affection extending to the eustachian tube; it may accompany paralysis, and some affections of the brain. When it occurs in the course of a fever, it has been estimated according to the period at which it comes on, and a moderate degree, occurring late in this disease, has been deemed favourable, but much must depend upon the accompanying symptoms.

Similar observations may be made on the faculty of *smell*. Cases do occur in which it appears to acquire a greater degree of acuteness, but most commonly it is diminished or perverted, which changes readily take place from affections of the pituitary membrane. Sometimes in delirium patients are much annoyed with imaginary unpleasant odours, but these may really be present, and arise from an ulcer or cancer taking place in the parts forming the organ, or from exhalations from the stomach or lungs.

The *taste* depends upon several indispensable conditions. "For the full exercise of taste," says Magendie, "the mucous membrane, which covers the organs of it, must be perfectly uninjured, it must be covered with mucous fluid, and the saliva must flow freely in the mouth. When the mouth becomes dry, the powers of taste cannot be excited. It is also necessary that these liquids undergo no change, for if the mucus become thick, and the saliva acid, bitter, &c., the taste will be exerted, but very imperfectly."

Taste is very much modified by age, by custom, &c.; for the simplest and least highly-flavoured food is generally preferred in youth, while in advanced life the more highly seasoned and more tasty meats are most palatable. But much depends on habit, since to those who have accustomed themselves to use only such food as is distinguished by peculiarity or highness of flavour, all other kinds appear tasteless and disagreeable, and by cultivation this sense may be rendered so very delicate that the slightest differences of flavour can be readily distinguished. In some cases it is much depraved, and a variety of substances, nauseous, or even disgusting, are devoured with avidity. Magendie remarks, when we find that a person has lost all sense of taste, and we cannot account for this by the state of his tongue or mouth, we may suspect that the trunk of the fifth pair of nerves is diseased. "Every thing that I chewed,"

said a patient so affected to him, "seemed to be earth that I was eating." If the lingual nerve is divided in an animal, the tongue continues to move, but it has lost the property of being sensible to savours; and, in this case, the palate, the gums, and the interior surface of the cheeks, preserve their powers of taste. Patients occasionally complain of peculiar sensations in the tongue not easily accounted for, since they are not relieved by attention to the state of the stomach, or by the remedies which we should consider applicable to them. Thus, in some, it is that of burning heat, as if the tongue had been dusted with cayenne pepper; in others, it is a strong acidity, &c.

The *touch*, taken in its limited sense, makes us acquainted with many of the physical characters of bodies, as their temperature, their hardness or softness, their roughness or smoothness, &c. This feeling is diffused over the whole of the body, but its principal organ is the hand, upon which have been bestowed elaborate descriptions and eulogiums, particularly by Galen, and lately by Sir C. Bell. And to this faculty as possessed by it, has been peculiarly applied the term *touch*, while that which is diffused generally over the body has been named *tact*.

"Tact," says Magendie, "is, with some few exceptions, generally diffused through all the organs, and particularly over the cutaneous and mucous surfaces. It exists in all animals, while touch is evidently exerted only by parts which are intended particularly for this use; it does not exist in all animals, and it is nothing else than tact united to muscular contractions, directed by the will."

The variations which this tact may undergo are such as have already been described under general sensibility, and thus it may be increased, diminished, or perverted. It also admits of being considerably influenced by habit.

INTERNAL SENSES.

The faculties of the mind are liable to suffer disturbances, and to undergo a train of serious and afflicting aberrations, some of which occur during the progress of other diseases, and must be considered as merely symptomatic, while others are idiopathic, but arise from causes difficult of explanation. We rarely find the memory, the imagination, or the judgment exercised with greater facility or clearness during disease; although it is remarked by some authors, that patients will sometimes think, act, and speak with greater clearness and more judgment, and display a more abundant flow of ideas than they were wont to do in health, and that in some cases, even just before death, a considerable elevation of the faculties of the mind has been observed. But although strong intellect may be possessed by persons of a weak and delicate frame of body, yet in almost all cases of disease the mental faculties either remain unim-

paired, or suffer some perversion, or become weakened, or completely lost. In some only one faculty may be impaired, in others all are equally disturbed at the same time. In those who labour under *mental derangement* such great differences are observed, and so obscure are the causes upon which these depend, that as yet we have no correct basis upon which we can establish a strict division between the varieties, or even a correct definition of an insane mind. "Where is he," says Esquirol, "who can flatter himself that he has observed and can describe all the symptoms of mania, even in a single individual?" The extent of the aberration is greater or less, as it is extended to all, or confined only to particular objects, or even a single one, or as the faculties of the mind only wander, or as they are completely lost; and any of these states may be an hereditary or accidental and acquired disease. But how difficult is it often found to decide upon that degree of eccentricity which may be considered consistent with sanity, or to determine accurately the limit between mere weakness or want of energy of mind and true imbecility, between a fool and an idiot. A man solely occupied in the pursuit of some laudable object, may so concentrate all the faculties of his mind on it, as to act in other respects in a manner so singular as to render him liable to a suspicion of his sanity, and this suspicion would be justly entertained if the object pursued were worthless and irrational.

A degree of mental aberration occurs during the progress of some diseases which has received the name of *delirium*, and which may exhibit as great variety in its symptoms as the cases of more decided mental diseases. Of this two principal varieties are described, the delirium *mite* and delirium *ferox*.

In the former of these it would scarcely appear that any delirium was present, except upon careful examination. The patient may lie still, but mutters to himself or preserves an obstinate silence, or he may be engaged in some constant action, as attempting to rise from his bed, throwing his coverings off, or in conversing with some imaginary person, or gazing at some fancied object. In some cases only a slight change in the patient's manner will be remarked; thus he may speak more quickly, or in a tone different from what is natural to him, or he may appear anxious to evade being questioned, or very unwilling to adopt any plan or remedies proposed to him. In the delirium *ferox* the patient is in a state of great excitement, and is with difficulty restrained from committing violent actions. He starts from his bed, resists restraint, and is often engaged in shouting or singing, or menacing those around him. At other times he weeps bitterly, tries to injure himself, and in short, exhibits a rapid succession of extravagant actions and ideas, accompanied by wildness in his countenance, and generally flushing of the face.

Delirium may be constant, or come on only at intervals; thus sometimes the patient is free from it in the day, and only affected during the night. Its character varies much: it may be sombre

and sad, or gay and cheerful; it may be excited by surrounding objects, or it may derive its source from ideas suggested by the mind itself, which may conjure up a thousand shapes and forms to amuse or irritate. It may be produced by different causes, and come on in connexion with very opposite states of the system. Thus it may be the consequence of increased determination of blood to the head, of some inflammatory affections of the brain or its membranes, while at other times it is produced by debility or loss of sleep, especially when of long duration, and in irritable patients very slight causes will occasionally excite it. We must consider the brain to be the real seat of delirium, but in many instances we cannot detect any alteration in its structure, or even in its membranes, to which we can refer it. A remarkable form of delirium, accompanied by tremors of the hands and limbs, from whence it derives its name of *tremens*, follows the immoderate and continued use of intoxicating, particularly spirituous liquors, and is generally marked by symptoms of exhaustion of the nervous power, a weak and frequent pulse, and cool and often clammy cold skin. This delirium generally is more or less associated with the patient's ordinary avocations, and, in several cases which have fallen under my care, with great volubility of tongue and rapid succession of ideas; particularly in one who combined in his ramblings the subjects of his double occupation of publican and parish-clerk, in a most rapid and singular manner. A variety of this delirium with tremor, but accompanied by symptoms of increased vascular action in the membranes of the brain, by great irritability of temper, and resistance to opposition, may be produced by exciting the cerebral organs when under the influence of depressing causes, as by intense study, &c.

The mental faculties undergo in the course of some diseases considerable diminution of their energy, and occasionally appear incapable of receiving external impressions, so that we observe every gradation from a greater inclination to sleep to complete insensibility. Some of these states bear a great analogy to natural sleep, and different names have been applied to them, especially by the older writers. Thus *somnolentia* is a state intermediate between sleeping and waking, while *sopor* or *catopora*, is a deep heavy sleep, from which the patient is not easily aroused. These expressions are now little used, and we generally speak of them as indicating a tendency to, or as being different degrees of *coma*. Of this two species are described, the *coma vigil*, or typhomania, in which the patient lies with his eyes closed, but opens them when aroused or spoken to, and soon closes them again. This state is accompanied by a degree of delirium, the patient mutters to himself or utters cries, seems uneasy and anxious to change his position; while in the other species, the *coma somnolentum*, the patient, although we may succeed in rousing him, and obtaining with difficulty an answer to our questions, soon relapses into his former state of stupor and immobility. Still higher degrees have been denominated *lethargy*

and *carus* ; in the former of these the sopor is deep and constant, and, when awakened, the patients seem not to know what they say, and forget what they have said, while in *carus* it is impossible to rouse them by any means. These different states form a principal symptom in some affections of the brain, they occur also during the progress of many other diseases, and indicate a proportionate affection of this organ. Thus, in the course of a fever, our suspicions should be excited when the patient makes no complaint of thirst, although we find great heat of skin and dryness of the mouth, or when, after having put out his tongue, he allows it to remain so, as if he had forgotten to retract it ; when he passes his evacuations without giving intimation to his attendants, or when he appears indifferent to those around him, and to their grief for his situation. "The morbid increase of sleep," says Rostan, "of which the different degrees have been pointed out, always depends upon cerebral compression. The coma or *carus* denotes, in fact, a greater or less effusion of blood or serum in the interior of the cranium. But these phenomena only indicate a general or central injury of the brain ; when the effusion of blood occupies the tuber annulare, or the beginning of the medulla spinalis, there is a comatose (or rather carotic) state. When the effusion, without being central, is so great as to compress the healthy hemisphere, or when it occurs in the ventricle, the same state occurs. Serious effusion, which is almost always a secondary affection, also produces coma. It may take place between the pia mater and the arachnoid, or be collected in the ventricles, as a consequence of acute inflammation of the brain or its membranes, when it occurs generally at the close of these diseases, or it may be the result of some chronic affection of the encephalon, or the parts adjoining."

But, as Dr. Abercrombie remarks, the state of lethargy presents some interesting phenomena, in regard to the extent to which it may exist without passing into apoplexy, and without permanently injuring the functions of the brain, though they are for the time completely overpowered and suspended.

Sleep, that necessary repose to the organs of sense and voluntary motion, is often during disease much disturbed and interrupted. Watchfulness is injurious even in health, but during disease it forms a very troublesome symptom, and may be protracted until a high degree of irritation, or even delirium, is induced. Loss of sleep may be produced by many causes, as violent pain, uneasiness of body or of mind, increased determination of blood to the head, great general excitement, &c.

The sleep procured during disease may produce little refreshment. It may be interrupted by dreams, or by uneasy sensations ; the patient may start, and wake alarmed and anxious, as is frequently the case in affections of the heart and respiratory organs, as well as at the commencement of acute diseases. In all cases, a tranquil and sufficiently long sleep, especially when accompanied by calmness in the pulse and a moist skin, may be considered highly

favourable, and any deviation from this is unfavourable, in proportion to its intensity and duration. But it may be protracted beyond the natural term. The quantity required by different individuals, and at different ages, varies. Infants sleep much, and as age advances the duration of natural sleep generally diminishes. In debility, too, we often see patients sleeping much more than is usual with them when in health. Whenever, then, we find a patient sleeping longer or more profoundly than natural, this should excite no alarm if it appears to refresh him, and if, when roused and properly awakened, he can readily answer our questions.

Sometimes the functions of the brain are temporarily suspended, as, for instance, sensation, perception, and the knowledge of external objects, and yet there are present no other remarkable symptoms except this loss of consciousness. The person may, in the midst of any occupation or conversation, lose himself for a time, and then either gradually or suddenly return from this state, and carry on the subject in which he was engaged, sometimes as if unconscious of any interruption having occurred. When this state is accompanied by a sensible diminution in the force of the circulation and respiration, paleness of the face, and loss of power in the limbs, it is termed *syncope*. A distinction is made between this and *lipothymia*, which are only different degrees of the same state, *syncope* being considered that in which the circulation and respiration are most sensibly affected. This is sometimes produced in consequence of serious disease, as of the heart and large vessels; at other times it may proceed from various and even very slight causes, as from some affection of the mind, from the sight of some displeasing object. It occurs during many diseases, as from debility, excessive evacuations, affections of the stomach, from pain, &c.

DIGESTIVE ORGANS.

The healthy condition and action of so many organs being necessary for the due performance of digestion, it frequently happens that slight causes more or less disturb this important function. These disturbances occur during the progress of many diseases, and in some cases it is difficult to decide whether the errors in the digestive organs should be considered merely as symptomatic, or as the essential causes of those affections in the course of which they are observed. For many anomalous symptoms may appear as their consequences, and it not unfrequently happens that an alternation takes place, so that some diseases, in which they have been affected sympathetically or indirectly, seem to be kept up or again excited by causes acting on the digestive organs.

For the healthy performance of digestion it is not only requisite that all the parts immediately concerned with this function should be in a healthy state, that the food should be properly masticated

and mixed with the different secretions necessary for its solution, and steadily propelled through the intestinal canal, that certain portions of it should be absorbed, and its excrementitious parts regularly discharged; but it is also of great importance that other functions of the body should be correctly performed, more especially those of the nervous system and the skin. Digestion being thus intimately connected with other healthy actions, it readily appears that disturbances in them will naturally produce corresponding errors in it.

Man is instinctively led to supply the wants of his economy by the feelings of hunger and thirst. These feelings are much more active during health in some persons than in others, and a number of causes may operate so as to increase or diminish them at different times; some capable of producing greater activity of the nutritive process, have a tendency to increase the appetite for food, while others tending to impair it manifestly produce a diminution in this desire.

The appetite for solid food is rarely increased in disease, although occasionally it may be so, and to a degree producing great uneasiness when it is not satisfied. Cases of this kind are detailed under the term *bulimia*, wherein very large quantities of food, of almost all qualities, have been voraciously devoured. A degree of increased appetite appears to attend some irritations of the stomach; thus, Rostan has frequently seen it in cases of organic disease of the digestive organs, more particularly of the stomach. It sometimes attends worms in the intestines, as well as some nervous affections, as hysteria, mental alienation, &c. In the recovery from disease, where the system, previously depressed, is actively engaged in repairing its losses, we cannot consider it otherwise than natural and favourable, unless we find that it produces excitement and disturbs the general system.

Generally, however, in disease, the appetite is diminished, or completely lost, the patient feeling a complete dislike for food of any description (*anorexia*), or else becoming very fastidious; and sometimes substances are longed for, and greedily consumed, which are not usually employed for food, and are even disgusting, and is termed *pica*.

The *thirst* is generally much increased, particularly in acute affections, and forms a pretty accurate measure of their intensity. In cases where great evacuations take place, as in profuse sweating, much purging, or a copious flow of urine, a corresponding increase in the desire for liquids may naturally be expected. In some chronic diseases, it may also be present; but, generally speaking, it should be considered more peculiar to the acute, or to irritation in the digestive organs. Whenever, under circumstances in which we might naturally expect it, we find that the patient does not complain of thirst, we suspect, as I have previously observed, the presence of some affection of the brain.

In some instances, a depravation is shown in the desire for dif-

ferent drinks, similar to that of the appetite, but much more rarely; and in others, although the patient may experience a great anxiety to partake plentifully of fluids, yet he has so great difficulty in swallowing them, as to induce a great fear in him of any attempt to drink. This may arise from affections of the pharynx, &c.; but it proceeds most remarkably from the bite of a rabid animal, forming the disease named hydrophobia, a disease very imperfectly understood, and, perhaps, improperly named, since, in some cases which I have seen, there was present an anxious wish to quench an ardent thirst, and the spasms were most strongly induced when the patients had succeeded in receiving the fluid into the mouth and made the attempt to swallow it.

THE MOUTH AND TONGUE.

The appearances of the parts contained in the mouth, more particularly of the tongue, are important. The *teeth* often prematurely decay, or are covered by a coating of a thick tenacious and more or less solid substance, in persons who suffer much from indigestion. The different coatings observed upon them in disease, as in fevers, are generally similar to those of the tongue. In phthisis, the teeth are said to be of a brilliant blueish white colour, or of a pearly appearance; this is, however, denied by Blumenbach. Grinding or gnashing the teeth frequently indicates the presence of some irritation in the *primæ viæ*; this may also proceed or accompany convulsive diseases, cerebral congestion, or delirium.

The *gums* are generally pale in chlorosis and chronic diseases, accompanied by much debility. In fever, they generally have the same appearance as the tongue; they become spongy, soft, and swollen, and bleed from slight causes in scurvy, and, in bad cases of this disease, they are livid and emit a very fetid odour. In diabetes, they often leave the teeth and shrivel up, or ulcerate, so that the teeth easily fall out.

The appearance of the *tongue* should be attended to in all diseases; as well in those which are connected with, as in those which are not situated in the digestive organs. For although the importance of the signs derived from it has been, in some degree, exaggerated, still many valuable deductions may be formed from observation of it. It is always well to know its general appearance, in patients under our care, and to bear in mind that, if examined soon after sleep, it may appear dry, and even discoloured, in those who are accustomed to sleep with their mouths open. If we remark any coating or discolouration, we should inquire if the patient has taken anything which could have given it this appearance.

The tongue may vary in the degree of moisture, or dryness, which it exhibits, in the coating which forms on it, in its colour, its size, and its motion.

It may become dry, shining, and of a bright colour, which gene-

rally indicates irritation, or a degree of sub-acute inflammation, of the mucous membrane of the stomach or intestines, and is most remarkable as the debility seems to increase. Thus in cases of cholera, the tongue is at first coated; but as the disease goes on, and the patient's strength becomes diminished, this red glazing becomes apparent. It is often seen in phtisical cases, and in diseases of irritation, accompanied by debility. Sometimes it becomes dry and rough, the papillæ appearing elevated. This dryness may become very great, and the surface of the tongue exhibit cracks or fissures, of greater or less size. Generally some degree of coating accompanies this dryness, varying in colour and extent, sometimes only occupying the centre of the tongue, and leaving the edges nearly clean, so as to be pyramidal in form, having its broadest part corresponding with the base of the tongue. Some people, however, who enjoy good health, are seldom free from a degree of this appearance, but in them the tongue is commonly moist. The coating may extend over the whole surface, and it is a favourable sign, in such a case, when it begins to clean at the edges. The degree of thickness, and the tenacity with which the coating adheres, also varies; sometimes it may be easily scraped off, leaving a tolerably clean surface beneath, at other times it is firmly adherent. And whenever a highly coated tongue, as in fever, suddenly becomes clean, but, at the same time, appears dry, red, and shining, it may be considered to indicate inflammatory affection of the *primæ viæ*. The surface is sometimes coated only in the interstices of the papillæ, which appear elevated, and of a bright red colour, as in scarlatina; but in some cases of this disease, I have seen the tongue of a bright red colour, even in the interstices of the elevated papillæ.

The colour of the coating varies. It is generally white, and giving the tongue the appearance of being covered with a milky fluid, in affections of the head. At other times, it is yellowish or brownish, or of a deep brown, or black colour. This latter appearance has been considered indicative of a high degree of gastric irritation; but it may, with much more correctness, be deemed a sign of great debility. It is often met with in cases of fever, characterized by considerable loss of the powers, both of body and mind, coming on when the debility seems greatest, and disappearing as we succeed in removing this state upon which I suppose it to depend. If it furnished a sign of the intensity of inflammation in the *primæ viæ*, it is natural to expect that it would be seen in all cases, where this was present, in a remarkable degree. But in instances where the mucous membrane has been found, after death, much diseased, where extensive ulceration has taken place in it, I have remarked the tongue exhibiting, during life, the dry shining bright red appearance, generally so characteristic of gastric inflammation. Sometimes small ulcerations are observed on the tongue, or a number of small superficial white specks, distinct or in clusters, named *aphthæ*. These vary in size and extent; are sometimes confined to the tongue, or extend to the pharynx, and form a symptom of

greater or less importance, according to the state in which they occur. They are often observed at the close of serious affections of the mucous membrane of the stomach and intestines, and in tubercular phthisis, and may be considered the sign of approaching death.

The size of the tongue may vary, but certainly not in proportion to that of other parts of the body, although in inflammatory affections, of itself and the neighbouring parts, it may become so large as to threaten suffocation.

The alterations which take place in the facility with which it is able to execute its *motions* are interesting. Thus they may be tremulous, and executed with difficulty, as in cases of great debility, or the power of moving it, or, at least, protruding it, may be much impaired, or entirely lost; and in cases of hemiplegia, it is drawn to the side opposite to that affected.

The *deglutition* may be performed in a manner different from what is natural, in consequence of diseases in the organs concerned in this function; as also sympathetically, in consequence of the relations which these have with other parts. In all cases where we find deglutition affected, the parts concerned in its execution should be carefully examined. It is not often accelerated, although this is sometimes the case in nervous and convulsive affections, when it appears to take place by a hasty and convulsive movement. It is more generally impeded, or rendered difficult and painful, as in inflammatory affections of the tongue, fauces, and tonsils, or of the larynx or pharynx, or where any impediment exists to the free passage of the food through the pharynx and œsophagus, as from abscess or tumour pressing on these parts, or where these parts are affected with paralysis or spasm. In some cases, solid substances can be swallowed most easily; in others, liquids can alone be taken without great difficulty, and this has been considered a sign by which we may, in some measure, decide whether the impediment is produced by inflammation or paralysis. For it is conceived, that solid substances produce more compression and uneasiness in inflammation than liquids, whereas, in paralysis, when the alimentary bolus possesses some bulk and resistance, it requires a less contraction and effort, on the part of the muscles of deglutition, for its propulsion than liquids. This, however, cannot be much depended upon; and since liquids require the greater effort, they often prove very painful to these parts when inflamed.

In cases of great debility, deglutition often becomes distressing to the patient; and as disease approaches to a fatal termination, generally, this difficulty increases, until the patient loses the power altogether. So that if we attempt, by putting any fluid in his mouth, to induce him to swallow, we run the risk of producing suffocation (unless he has remaining strength enough to expel it by coughing), the fluid passing into the larynx, in consequence of the epiglottis having, in a great measure, lost its protecting power.

Deglutition may be altered in consequence of a prolongation of

the uvula ; this produces the sensation of a portion of food always presenting itself to the fauces, and is apt to keep the parts in almost constant action. In cases of cleft palate, the aliments frequently return, partially, by the nostrils.

NAUSEA AND VOMITING.

“Nausea,” says Magendie, “is that internal sensation which announces the necessity of vomiting: it consists of a general uneasiness, with a feeling of dizziness in the head, or of uneasiness in the epigastric region; the lower lip trembles, and the saliva flows in abundance. Instantly and involuntarily, convulsive contractions of the abdominal muscles, and, at the same time, of the diaphragm, succeed to this state. The first are not very intense, but those that follow are more so; they, at last, become such, that the matters contained in the stomach surmount the resistance of the cardia, and are darted, as it were, into the œsophagus and mouth. The same effect is produced several times in succession; it ceases for a time, and begins again after some interval.”

Vomiting was generally considered to be produced by an inverted action of the muscular fibres of the stomach. Magendie, however, has tried by experiment to establish, that in this process, the stomach is nearly passive, and that the true agents of vomiting are, on the one hand, the diaphragm, and on the other, the large abdominal muscles, which generally co-operate, yet each of them can produce it separately. These experiments have been much criticised, and the deductions in part corrected; for it appears most probable that, although the action of the diaphragm and abdominal muscles very powerfully assists the act of vomiting, yet, that the stomach is by no means passive.

Dr. Marshal Hall, in a paper published in the *Quarterly Journal of Science*, June 1828, after detailing some experiments, concludes that the act of vomiting is a forcible expiratory effort, the larynx being firmly closed, and the diaphragm perfectly inert; but he adds, “It is not intended to state that the act of vomiting is simply such as I have described. There are many facts, which appear to show that the œsophagus is not without its share of influence in this act, and it is plain that the cardiac orifice must be freely opened, for mere pressure upon the viscera of the abdomen, will not in ordinary circumstances evacuate the contents of the stomach. To effect this open state of the cardiac orifice, it is probably necessary that the diaphragm should, indeed, be in a relaxed rather than in a contracted state.” Rostan, after remarking that emetic substances will act when introduced into the veins, and even produce vomiting, according to the experiments of Magendie, when the stomach had been removed and its place supplied by the bladder of another animal, concludes that it is not by irritating the stomach that these substances act. Unpleasant odours or tastes, or even unpleasant

ideas, he adds, "may also produce it, and very obstinate vomiting is produced by tubercles in the brain, independent of the least sensible alteration in the stomach. Whence we may conclude, that vomiting is an action depending on the brain, most commonly however, induced by the state of the stomach, and that it may occur either idiopathically or sympathetically."

The feeling of nausea accompanies many diseases, sometimes continuing without any effort at vomiting, and sometimes attended by repeated attempts to evacuate the contents of the stomach. Vomiting may depend on a variety of causes, as upon some substance acting immediately upon the stomach, or irritating it, as emetics; upon inflammation of this organ, as produced by some poisons; upon physical obstruction, as in schirrus of the pylorus, and upon other diseases and affections of the stomach. It may also be symptomatic of other diseases, and occur in consequence of disturbance in the action of some other organ, which has influence upon the stomach, as the brain, kidneys, liver, and intestinal canal. Vomiting generally accompanies pregnancy, often appearing as the first symptom, and occasionally resisting all attempts to relieve it, and ceasing only when the cause is removed by miscarriage or delivery.

The act of vomiting may be performed with ease or difficulty, and even with considerable pain. In some cases, the patient after retching for some time, will only be able to bring up a small quantity, and it is important to observe whether it relieves him; for, sometimes, a quantity of undigested food, or other matters capable of irritating the stomach may be thrown up, and produce almost immediate relief; while in others, the very act of vomiting may increase the uneasiness, and the affection upon which it depends. Whenever any great irritability exists in the stomach, generally all except the mildest substances will induce vomiting. If the cardiac orifice is affected, we have rarely vomiting, but, perhaps, a degree of regurgitation. Whereas, if the pylorus is affected, the vomiting comes on some time after eating.

The substances brought up are very different. Thus, they may consist of the aliment in different stages of digestion, or of portions of food which appear to have undergone no change. The stomach frequently relieves itself by vomiting, when overloaded, as also at the commencement of many affections, especially of the brain. Occasionally, a quantity of mucus is discharged, sometimes so tenacious as to resemble membrane, which may be considered as indicating irritation or inflammation of the mucous membrane. In a case which I attended some years ago, the quantity brought up was considerable, and so tenacious, that the whole portion of it, contained in the vessel, might be raised and remain suspended on the point of a stick. At other times, a quantity of bilious matter, of a yellow or green colour, is vomited. That, which by the ancients, was called atrabiliary, and which is of a brown or black colour, is considered to consist of blood mixed with the matters

contained in the stomach, and not of bile changed in quality or colour. Stercoraceous matters may be discharged by vomiting, denoting obstruction in the intestines, produced by hernia, by intussusception or morbid obliteration of the intestinal canal, or by a state of violent inflammation. Pus may also be vomited, when an abscess forms in the coats of the stomach, or in some neighbouring part, and which has opened into it.

Sometimes blood is brought up, and it is necessary to discover, if possible, whence it proceeds. That which comes from the stomach is deep coloured, and often mixed with some alimentary or medicinal substances, and is expelled by vomiting, preceded by weight and uneasiness in the epigastrium; whereas that from the lungs is more commonly of a bright colour, frothy, and preceded by uneasiness in the chest, by cough, or impeded respiration. But the colour may vary, for if the blood has been delayed in the lungs some time before it is discharged, it may be darker coloured, while that which proceeds from the stomach may be occasionally of a brighter red, so that we are, generally, best enabled to decide, by considering the circumstances under which it has taken place, and the symptoms which precede or accompany it. Hematemesis, or vomiting of blood, may be symptomatic of some other disease, or it may occur vicariously, that is, in the place of some natural discharge, or accustomed hemorrhage, as in suppression of the catamenia. In all cases, we must be careful not to overlook the possibility of the blood proceeding from the nose, tonsils, or gums.

But the substances vomited, may exhibit other characters; thus, they may be inodorous, acid, fetid, and very unpleasant to the smell; their colour, of course, varying from admixture with different substances, as bile, blood, or any thing which has been taken lately into the stomach. The quantity of the matters ejected from the stomach, and the frequency of repetition, as well as the duration of the vomiting, are important. In some instances, we find it impossible to excite vomiting by any means, however calculated to produce it. This state may be produced suddenly, in consequence of a paralysed state of the stomach, as occurs when large quantities of spirituous liquors, or narcotic substances, have been taken, or it may, in a less degree, be the result of long established disease in the stomach. Rostan states it to be the case, when the pylorus is ulcerated to such a degree, that this opening is larger than natural, and the substances pass readily into the duodenum.

I may remark, as some degree confirming this observation, that in a case which I attended, and in which all the symptoms of schirrous pylorus were present, and continued for some time, the vomiting, at last, ceased entirely: and upon inspection, after death, there was found considerable disorganization in the pylorus, and the orifice was, in consequence, larger than natural.

A great difference exists in the state of the *bowels*, even of persons who appear to enjoy a good state of health, as well as in the same individual at the different periods of life. In young children,

the alvine evacuations are more fluid and frequent than in older children, and, generally, as life advances, the bowels become more sluggish, and in some old people, a degree of constipation would seem to be almost essential to their health and comfort. Much depends upon habit, diet, and mode of life, for those who are occupied in sedentary employments are generally costive. In old people, confined to their beds, or in those who are inclined to costiveness, and who neglect to pay proper attention to the state of their bowels, a great accumulation may take place in the rectum and lower part of the colon, acquiring so great a degree of hardness, as to require mechanical means for its removal.

Constipation accompanies many diseases, and forms a symptom of greater or less importance, according to the state of the patient, and the cause producing it. It is frequently observed at the commencement of acute diseases, and in cases where considerable discharges have taken place, it is seen frequently during convalescence, and after any considerable purging, either natural or induced by medicines. We may sometimes be deceived by trusting to the patient's account, unless we are careful in our inquiries, since, if the bowels have been neglected, they may contain a quantity of hardened feculent matters, called scybala, which, by their irritation, produce a degree of increased secretion from the bowels, and liquid stools; and these may, also, follow the exhibition of medicines, and induce a belief that the bowels are fully and freely evacuated. Constipation accompanies affections of the brain and spinal chord. It is also present in inflammation of the muscular coat of the intestines, and often, but not necessarily, in inflammations of the peritoneum. Any impediment to the free passage of the fæces, as hernia, or intromission, produces a complete and dangerous constipation; tumours, or a schirrous uterus, may operate in a similar manner, although in a less degree. In colic, especially in that species produced by lead, the bowels are with difficulty operated upon, even by powerful medicines.

A moderate degree of constipation is a symptom of little importance, since it admits of ready relief; but where it is obstinate and of long continuance, and as it becomes more or quite complete, it is highly dangerous. When it depends on obstruction, as strangulated hernia, or invagination of the intestines, their peristaltic action may be inverted, and stercoraceous vomiting induced.

The evacuations from the bowels may be increased in frequency or in quantity, or in both; they may be of different consistence, and vary much in quality. Thus increased secretion may take place in the mucous membrane of the intestines, or their peristaltic action may go on more quickly than natural, so that the evacuations may be more copious, fluid, and frequent. The tone of the bowels may be diminished, or they may become so irritable as to act almost immediately after food is taken, which thus passes more or less undigested.

We can easily suppose an increased determination of blood to

the mucous membrane giving rise to increased secretion and irritability, and this increased secretion may be considered a natural cure, which, if checked, would be followed by inflammation. In the present day, it is much the fashion to attribute almost all cases of increased secretion from the bowels, to an inflammatory state of the mucous membrane; but surely, we cannot suppose that any such cause can operate in the diarrhœa, which follows slight emotions of the mind, the impression of cold upon the skin, and other slight causes, and which frequently comes on suddenly, and as suddenly goes off, nor can we apply it to the action of purgatives. An analogy may be observed between the mucous membrane and the skin, in which we see increased perspiration take place, independent of any inflammatory action. Increased determination of blood may take place, but if this exists to any great degree, we have no increased perspiration, but great dryness, which is often removed by means calculated to diminish the determination of blood to the skin. In some cases, diarrhœa appears to be the consequence of mere debility, and in others, to be symptomatic of some other disease. Sometimes it occurs without much, or indeed any, pain or griping, while in other cases, it is attended by severe and distressing pain, or by an almost constant desire to evacuate the bowels, with pain, uneasiness, and a sensation of forcing, and heat in the rectum, while, with all his efforts, the patient only passes a little mucous or blood, and this is called tenesmus. The passing of the evacuations is painful in diseases of the rectum and in piles, and this must not be mistaken for the state just mentioned; for affections of the rectum and piles may generally be distinguished by the pain only occurring at certain times, as when the rectum is loaded, or during an evacuation, and by the blood in the motion not being intimately mixed with the mucus or excrementitious matter, but appearing to have followed the evacuation.

Sometimes the evacuations take place involuntarily, or without the consciousness of the patient, as in some affections of the brain, or where the spinal chord is injured, or where great debility is present, as at the close of a disease about to end fatally. The desire to pass the stools is occasionally so urgent that the patient is unable by any effort to restrain them; this is owing, in some cases, to loss of power in the sphincter ani. A moderate diarrhœa occurring in some diseases may be advantageous, since it tends to carry off any thing capable of producing irritation in the intestines which might keep up and add to the general disturbance; but if the evacuations become frequent, very copious and fluid, they tend only to exhaust the strength of the patient. Sometimes when the digestive organs are disordered, we find diarrhœa and constipation alternating with each other.

The appearance and qualities of the alvine evacuations vary much. Thus they may be more solid than natural, they may be natural in appearance but more fluid, or they may consist of mucus resembling a strong solution of gum, or they may be little else than

mere water. Sometimes they resemble water in which a portion of meat has been washed, indicating a great degree of irritation in the mucous membrane, generally, indeed, the presence of ulceration. Their colour also differs, sometimes being white, showing a deficiency of the biliary secretion; sometimes abounding in bile, and of a yellow brown or green appearance. This green colour is often observed to come on in the stools of children after the nappkins have been kept for some time.

The stools may contain blood, more or less pure, or mixed with the other excrementitious matters. This is sometimes of a florid colour, at others dark, and occasionally appearing in large quantities, and vicariously, as in suppression of the catamenia. When it is in striæ, or blended with the mucous excreta, it may be considered a pretty accurate indication of the presence of inflammation. When it is unmixed, fluid, or clotted, it may arise from rupture of some blood-vessel opening into the intestines, from an hemorrhoidal tumour, or it may proceed from exhalation from the surface of the mucous membrane, which in some cases takes place to a very large amount.

Sometimes purulent matter is found in the evacuations, indicating either injury of the intestines themselves, or that an abscess of some other organ, as the liver, has discharged itself into them. The degree of fœtor which the excreta possess is sometimes very great and unpleasant, and differing much from their natural odour; sometimes, especially in children, their odour is very acid.

The origin of the different gases found in the course of the intestines seems uncertain. It has been attributed to the air introduced into the stomach by the different alimentary substances, and to their decomposition, and thus it was supposed that some were capable of disengaging more gas than others. More lately it has been asked, whether it may not proceed as a secretion from the mucous membrane. The abdomen occasionally becomes very tumid in consequence of the inflation of the intestines by this accumulated gas, as in hysteria; sometimes it is heard passing through different parts of the intestines, giving rise to sounds which are called borborygmi; sometimes it is pent up in a portion of them, and produces colic. Generally, when a quantity of gas, or wind, as it is called, is accumulated in a particular part of the intestines, those parts of them which are above and below it contract, and retain the flatus in the intermediate space; but as the muscular fibres of this portion begin to act upon it, the air is forced through the contracted parts, generally with pain, and some noise. A spasmodic contraction, however, sometimes takes place in a very small portion of the intestines; a single muscular ring perhaps, producing great pain, confined to a particular part, and constant for some time,—and thus it may be difficult to decide upon the real cause of pain occurring in the abdomen. But we can generally judge whether it should be attributed to inflammation, by taking into account the state of the pulse, the degree of general disturbance,

the manner in which the abdomen bears pressure, the position of the patient, and the character of the pain, as well as the manner in which it has come on and proceeded.

Accumulation of gas, and the tumours which may form in different parts of the abdomen, have already been noticed under changes in its external appearance.

RESPIRATION.

The symptoms presented by the apparatus of respiration are of great importance, both in the diseases of the organs immediately concerned in this function, as well as in its many sympathetic affections which occur during other diseases, either not confined to, or not situated in them.

The easy, quiet, and noiseless respiration of health is performed naturally with greater frequency in some people than in others, and in all, at different ages, and under certain circumstances, without producing any affection of the respiratory organs. It is estimated that in the first year the chest dilates and contracts thirty-five times in a minute, in the second year twenty-five, at puberty twenty, and in the greatest number of adults eighteen times in a minute. It is often more frequent in females than in males; and any exertions, as running or loud speaking, and various emotions of the mind, will accelerate it in both. During quiet and undisturbed sleep it is regular and equal, and a little slower than when the person is awake. Pain or uneasiness, an uncomfortable posture, an overloaded stomach, or distension of the bowels from flatulence, will often affect the ease and frequency with which respiration is performed; and in persons easily excited and quickly alarmed, very slight causes are sufficient to disturb it.

Laennec remarks, that the respiration is considered *natural* when the anterior and lateral parts of the chest dilate in an equal, evident, but moderate degree, during inspiration, and when the number of inspirations, made in the space of a minute, is from twelve to fifteen during a state of perfect repose. If the abdomen is proportionally raised with much more force than the walls of the chest, he terms the respiration *abdominal*. If, on the contrary, the dilation of the walls of the chest, particularly on the anterior and superior part, is more evident than that of the abdomen, he names it *pectoral*. This latter is often observed in painful affections of the abdomen, as in peritonitis; while abdominal respiration, and a remarkable defect or diminution in the dilatation of the chest, are generally considered to indicate some affection in the chest, or of its muscles. But he remarks that this is not always the case, since abdominal respiration and a full dilatation of the chest are occasionally quite compatible with a healthy state of the respiration, as regards the lungs and air-cells, and indicate only a purely vital increase in the necessity of respiring; and that a less apparent raising of the abdomen

and walls of the chest indicate a diminution of this necessity, varying according to age, the states of sleep or waking, of action or repose, of a quiet or agitated mind. Collin calls that respiration complete in which both lungs are equally engaged, and which is characterised by equality in the force and extent of the movements of the chest. He terms it incomplete when one side remains partly or wholly fixed, and moves much less than the opposite side; and he considers this, more especially in young children, a valuable symptom, often leading us to suspect disease, as inflammation of the pleura or lungs, in the side on which it is observed. It is, however, met with in people who enjoy perfect health, but is then the result of some former disease which has left strong adhesions of the pleura; and it may also be produced by simple pleurodyne, or pungent pain in the side, unaccompanied by fever or inflammation.

The respiration may vary in *frequency*, or in the number of inspirations and expirations executed in a given time; in the *quickness* with which inspiration and expiration are performed; in the *quantity* of air inspired and expired; in the *difficulty* with which its actions are performed; in their *inequality*; in the *sounds* which attend them; in the *quality* of the air expired; and in the *signs* afforded by *auscultation*.

Respiration may be considered frequent when it exceeds eighteen or twenty inspirations in the minute, and less frequent than natural when it does not perform so many. The more it differs from the natural standard, the more important are the deductions to be made from it. But we must bear in mind that although this alteration may be produced by disease in the respiratory organs, it may also be symptomatic of irritation, and is even natural to some individuals, or induced by very slight causes, as in children and persons of irritable habit, and is observed in spasmodic affections, as hysteria, and in almost all the pyrexiaë. A pain in the chest, any obstacle to the free circulation of the air in the bronchi, which renders a somewhat considerable portion of the pulmonary texture unfit for the performance of respiration, are causes of its frequency; the suspension of the nervous influence, from a congestive state of the veins of the encephalon, or sanguineous or serous effusion into its ventricles, and the weakness of the muscular powers, are those of its infrequency.

The *rapidity* with which the breathing is performed varies, and constitutes *quick* or *slow* respiration. Generally the degree of quickness or slowness corresponds with that of its frequency, but not always. Thus in pleurisy the respiration may be quick but not frequent, the violence of the pain during inspiration producing a quick expiration; and sometimes the respiration may be very quick, but at long intervals, as in cases where the vital powers are sinking, when the rapid manner in which both inspiration and expiration are performed gives the appearance of a convulsive effort repeated at distant intervals. When the respiration is both quick

and frequent it is said to be accelerated, and when this is to a great extent, it becomes panting.

In a full and deep inspiration the *quantity* of air inspired is considerable, in a small one it is less so. The chest may, however, appear much elevated and dilated, yet by no means in proportion to the quantity of air inspired, each inspiration being accompanied by a considerable elevation of the ribs, and motions of the *alæ nasi*, and not preceded by a full expiration. This is seen in pneumonia, and when it occurs at considerable intervals it has long been considered as indicating some affection of the brain.

Difficulty of breathing, or *dyspnœa*, occurs whenever the act of respiration is performed with uneasiness or pain, or with the sensation of oppression or weight on the chest, when the muscles ordinarily employed in it contract violently, and, as it were, convulsively, and when the accessory muscles are more or less called into action. Great varieties of *dyspnœa* occur; thus it may be only slight, or laborious, with a greater or less sensation of oppression at the chest, or it may amount to *orthopnœa*, when the patient is obliged, from the fear of suffocation, to sit erect, and cannot be induced to assume a recumbent position. "In this case," says Collin, "the patients threatened with suffocation cannot preserve the horizontal position; they sit bent forwards, and press their heads forcibly against their raised knees, seeking a solid support for their hands, and thus fixing their superior extremities, they painfully contract the great muscles of respiration, all the efforts of which are concentrated on the chest, to produce its dilatation."

Difficulty of breathing may arise from any cause which presents an obstacle to the free admission of air into the lungs, and to the free and full dilatation of the chest, wherever such impediment is situated. It accompanies a variety of diseases, and is always to be regarded as a symptom of greater or less danger, in proportion to the symptoms which accompany it. In *regular* respiration a succession of equal inspirations take place at equal intervals, each followed by a corresponding expiration. If any inequality is remarked in these, the respiration is said to be *unequal*; thus a quick or a slow inspiration may be followed by an expiration of a different character. When the pleura is inflamed the inspiration is quick, but the expiration, although short in reality, is yet long in comparison with the inspiration, which is easily accounted for by the seat of the pain. When the lung itself is inflamed, the act of expiration, which cannot be performed without painfully compressing the affected organ, is quick, and sometimes scarcely perceptible. Irregularities may also be observed in the intervals; thus, after several respirations, and when we expect the patient to inspire again, a longer interval than usual may take place, when the respiration is said to be *intermittent*; or, as in that which is termed *interrupted*, the expiration may take place before the inspiration appears to be finished, and is then immediately followed by a fresh effort, without the appearance of any interval. Some-

times the dilatation of the chest seems to take place by several short and successive inspirations, and its falling again by a similar set of expirations, resembling the breathing of persons crying, and frequently observed in hysteria.

Where no impediment exists to the free passage of the air through the lungs, respiration is performed without any sensible noise, except a slight murmur, which is generally most perceptible during sleep. Sometimes the breathing is accompanied by a *hissing* sound, heard both in inspiration and expiration, or at other times only in inspiration. At the commencement of croup this is very remarkable, and, as it increases, resembles the noise occasioned by air forced through a dry tube; and I may remark, what is important and apt to deceive, that this croupy breathing generally is not so perceptible during sleep. The respiration sometimes sounds like a person sighing or moaning. Huxham mentions "a kind of sighing or sobbing respiration," as occurring in fever. It may, indeed, accompany any great uneasiness or suffering, but is most commonly observed in acute diseases of the lungs. It is called *stertorous*, when both inspiration and expiration are accompanied by a noise like snoring, and which Hippocrates compared to that proceeding from boiling water. "Stertor differs from snoring," says Chomel, "in the difficulty of the movements of the chest which accompany it, as also in the place from whence the sound proceeds. Stertor would appear to have its seat in the trachea and larynx, snoring in the nasal fossæ, or the posterior part of the mouth."

The chief changes observed in the air expired are in its temperature and odour. In health it has a moderate degree of warmth, but in some diseases of an inflammatory character, especially when these are seated in the lungs, it becomes much hotter; while in others, where the functions of the lungs are imperfectly performed, it is observed to be colder than natural, which occurs in cases of fever, and in other diseases accompanied by great debility, and is often very remarkable in cases of the pestilential cholera.

Sometimes it has a very fetid odour, which may be occasioned by disease in the lungs themselves, as by gangrene, or by affections of the stomach or mouth, as decayed teeth, ulceration of the gums, &c. In some, particularly febrile diseases, it has a faint sweetish odour.

The symptoms afforded by the organs of respiration being often similar in different affections, any method which can promise a more certain means of distinguishing them may be justly considered a very important addition to medical science.

Avenbrugger first suggested the idea of *percussion* of the chest, and directed attention to the different sounds heard upon gently striking its parietes with the ends of the fingers. The healthy chest sounds as if the percussion was made upon a hollow cavity, and this sound becomes dull, less perceptible, or entirely disappears in some diseases. Corvisart very much improved upon this discovery

of Avenbrugger, which he rescued from neglect, and made known to Europe, and even to the country of its discoverer, whose only reward seems to have been the mention made of him by Van Swieten and Stoll. But, as Laennec observes, although these observations are valuable, they leave much to be desired; and as they are confined merely to the indications of full and empty, they can only be applied to a certain number of organic lesions, and do not prevent our confounding affections very different in their nature and seat; they scarcely ever indicate anything, except in extreme cases, and do not lead us to suspect diseases at their commencement.*

Bayle proposed the application of the ear to the chest in diseases of the heart, an idea which may be traced to Hippocrates, in order to ascertain more correctly the pulsations of this organ. But it was reserved for Laennec to invent a method of investigation at once ingenious and valuable, and which he has named *auscultation mediate*. His work upon this subject deserves the serious attention of all who are engaged either in the study or practice of medicine. It is distinguished by patient research and accurate observation, and although we may not expect to acquire that power of discrimination which he appears to have possessed, nor be tempted to trust solely to stethoscopic observations, yet we must with pleasure admit that it is in our power to apply his principles with considerable benefit to the investigation of diseases of the chest.

The examination is made through the medium of a perforated cylinder, applied at one of its extremities to the different parts of the chest in succession. It should be held like a pen, by the hand placed very near the chest, and it should be applied so as to leave no space between its extremity and the part to which it is applied.

To the one extremity of the instrument, which is hollowed out like a cone, is adapted a moveable piece exactly fitting it, and which must be removed when we wish to examine the signs afforded by the respiration and some affections of the heart, but replaced for observing the pulsations of the heart and the signs furnished by the voice.

When the stethoscope is applied to a healthy chest, we hear a gentle and distinct murmur, indicating that the inspired air penetrates into the pulmonary texture, and is duly expelled from it. This is heard over the whole of the chest, but is most perceptible in those situations where the lungs are nearest to the walls of the chest; that is, in the anterior superior, in the lateral and posterior superior parts of the chest. The axilla, and the space comprised between the clavicle and superior margin of the trapezius muscle, are the points where it is loudest. This respiratory murmur is much more distinct in children than in adults, and is also different in sound. "It appears," says Laennec, "as if in them you could

* M. Piorry has applied his invention, the pleximeter, which I have already described, to the examination of the chest.

distinctly perceive the air-cells dilate to their full size, while in adults one would suppose that they only were half filled with air, or that their walls, being more dense, will not admit of so great distension." This *puerile* respiration, as he terms it, is occasionally heard in adults, who are not labouring under disease of the chest; but most generally it is met with in cases where a portion of lung has become impermeable to air, and is then heard in those portions of the lungs which are healthy.

When the respiratory murmur is only heard in particular parts of the chest, we may conclude that in those where it has ceased the corresponding portion of lung has from some cause become impermeable to air, or that something is interposed between the lungs and the walls of the chest.

If the stethoscope be placed upon the larynx, or the cervical portion of the trachea, the roots of the lungs, or where the large bronchial vessels are situated, the sound loses that slight crepitation which accompanies the distension of the air cells; it gives the idea of air passing through a larger cavity, and it appears as if the air passed through the hollow of the cylinder, drawn in by inspiration, and expelled by expiration. When this *tracheal* respiration is observed in other situations, it indicates the compression, or infiltration, of the pulmonary texture, which prevents the air from entering into its vesicles, and confines the respiration to the bronchi; and Laennec considers that it is more readily heard, since the texture of the lungs, being rendered more dense, becomes a better conductor of sound. When this becomes more intense, and appears to depend upon the air passing through a larger cavity than that of the bronchial tubes, it indicates the existence of an excavation in the pulmonary texture, formed by softened tubercles or abscess. The respiratory murmur may disappear, and become less distinct, during the progress of a disease, and after some time, again appear, and gradually acquire the natural sound, as in inflammation of the lungs, indicating the termination of this affection by resolution. Sometimes it is suspended for a short time, and may be again heard, even during the short period which we employ in making the examination, as may occur in pulmonary catarrh from the mucus temporarily closing the branches of the bronchi.

In addition to these sounds already mentioned, Laennec observed others, to which he has applied the name of *râle*,—which has been translated rattle by some, while Dr. Williams, and others, adopt the term rhonchus; the principal of which may be referred to four kinds, viz.: the mucous, the dry sonorous, the crepitating, and the hissing.

By the term rattle, is generally understood, that noise which is heard in the breathing of a dying person, and is produced by the air passing with difficulty through the mucus and other sputa, which he has no longer the power of expelling. This, according to Laennec, takes place in the larynx and trachea, or, at most, in the origin of the large bronchial tubes; and he names it *tracheal*, extending the term *râle*, or rattle, to all those preternatural sounds

which the air produces in traversing the fluids, found in the bronchi, or pulmonary texture, or in consequence of a partial narrowing of the air tubes.

The *mucous* rattle is produced by the passage of the air through the sputa, collected in the trachea or bronchi, or through tubercular matter, softened, but yet undischarged. This is the only one which can be distinguished by the unassisted ear, which it may be, when situated in the trachea, or large branches of the bronchi. Laennec compares the sound which it gives with the stethoscope, to that which is heard when any one blows through a pipe into a solution of soap in water; and he considers that the quantity and size of the bubbles may be easily estimated by attention. It may be heard in any part of the chest, over a greater or less surface; in some instances very weak, and only heard at distant intervals, in others loud and constant.

The *dry sonorous* rattle, rhonchus, or snoring, is more various in its character. It consists of a grave sound, and is occasionally very loud, resembling, in some cases, the snoring of a person asleep, in others, the noise made by a bass string, when rubbed by the finger, and in many, the cooing of the turtle-dove. Its cause is referred to some alteration in the form of the tubes through which the air passes: as, for instance, when, in consequence of inflammation, or pressure, or the local swelling of the internal membrane, the opening of a bronchial branch is narrowed, and its origin is thus smaller than any other part of its course. Dr. Williams has noticed a modification of this, to which he applies the title of dry mucous rhonchus, in which the sound resembles that of a click-wheel,—and which is produced by a portion of very adhesive mucus attached to the bronchial lining, and yielding to the air forcing a passage.

The *crepitating* rattle takes place in the pulmonary texture, and is compared to the decrepitation of salt at a gentle heat, to the noise made by a dry bladder during its inflation, or to that which proceeds from a healthy lung, inflated and pressed between the fingers. It differs only from this, says Laennec, in being a little more loud, and in conveying along with it the idea of moisture. It points out that the cells of the lungs contain a fluid of about the consistence of water, and which does not prevent the air from penetrating into them. It is easily recognized, he remarks, and is very important, as it forms the pathognomic sign of peripneumonia, in the first stage, ceasing when the lung has acquired any hepatic hardness, and reappearing when resolution is established. He describes a variety of this rattle, under the term *subcrepitating*, observed in œdema of the lung, and in hæmoptysis, which conveys the idea of larger and more fluid bubbles.

The *hissing*, or sibilous rattle, has many varieties, which may appear in different parts of the lungs at the same time, or even in the same part, at longer or shorter intervals. It is more or less acute or grave, dull or loud, resembling sometimes a slight hissing, and is ascribed to the presence of mucus, small in quantity, but

very viscid, and more or less completely obstructing the small bronchial ramifications.

Laennec describes also another rattle, the *dry crepitating with large bubbles*, which is heard only during inspiration, and gives the idea of the air distending dry and unequally dilated air cells, or its penetration into the cellular texture of the lung, indicating pulmonary emphysema, or the interlobular emphysema of the lung.

He also observes, that in every kind of rattle we may distinguish, besides the noise peculiar to each, a degree of slight trembling communicated to the cylinder, whenever the point upon which it is applied, corresponds with the part in which the rattle is situated. This tremor, very similar to that which the voice produces in the walls of the chest, may sometimes, like this, be perceived by the hand. When, however, the rattle is situated deep in the lung, in its most central parts, this tremor cannot be detected in any part of the surface of the chest; and when it is at some distance from the part upon which the stethoscope is placed, it is not perceived either by the cylinder or hand in the place examined.

A peculiar sound, to which he has given the name of *tintement métallique*, or *metallic tinkling*, is described as similar to that produced by striking a glass, or metallic vessel, gently with a pin, or by letting a grain of sand fall into it. This is heard during respiration, but much more remarkably when the patient coughs or speaks. He considers it always to depend upon the resounding of the air, agitated by respiration, by speaking, or by coughing, at the surface of a fluid, which occupies along with it the interior of a cavity preternaturally formed within the chest. It cannot exist but in one of two cases: as where an effusion of serum or pus, in the pleura, co-exists with an effusion of air (*pneumothorax*); or where a very large tubercular excavation or abscess opens into the chest. The presence both of a fluid and of air is necessary for its production; and it is also requisite that a communication should exist between the part in which these are contained and the bronchi. It is always most perceptible when the diameter of this communication is large, and the extent of the space occupied by the air may be estimated by the extent of the vibrations of the tinkling. Another sound was first noticed by M. Honoré, which Laennec termed the *friction of ascent*, and *descent*, and described as a dull sound, such as would be produced under the stethoscope, by the friction of the finger against a bone, and conveying the idea also of a body rising and falling, and, at the same time, rubbing rather harshly against another. It was only observed during inspiration, and he attributed it to interlobular emphysema of the lungs. But it is also heard in pleuritis under certain circumstances.

These are the chief signs derived by the stethoscope, from an examination of the chest, as far as regards the state of the lungs, a sketch of which seemed necessary in this place; their full application, and their real value, can only be ascertained by a careful study of the writings of Laennec, of Collin, Williams, &c.; and by frequent

opportunities of applying the stethoscope, and of verifying the observations made during life, by post mortem examinations, in all cases where it is practicable.

Under the head of respiration, may be arranged several actions which are dependent upon it.

Of *laughing* little need be said; it is scarcely ever a sign of a lesion of the organs which execute it, but almost always of those which command it. Immoderate laughter, when it takes place without any cause to excite it, may be considered to arise from an affection of the sensorial faculties. It is seen in some nervous diseases, as in hysteria, when it generally is succeeded by, or alternates with, fits of tears and weeping. It often accompanies delirium, and if we refuse assent to the Hippocratic aphorism, that delirium accompanied by laughter is less dangerous than that which broods over sad and serious subjects, we must, at least, admit that it presents a less distressing object for the contemplation of the surrounding friends.

Yawning is a long and deep inspiration, followed by a quick and strong expiration, and is often accompanied by another symptom, which may, however, occur alone, and is named *Pandiculation*, and which consists of a gradual extension of the limbs, particularly of the superior part of the body. These often indicate lassitude or fatigue; they are frequently observed at the commencement of acute diseases, and in the course of some chronic affections, particularly of the nervous system.

Sneezing consists of a violent expiration, by which the air is forced through the nose and mouth, generally accompanied by mucus. It is observed in inflammatory affections of the pituitary membrane, or in any case where this membrane is irritated. Increased determination of blood to it will also occasion sneezing; thus it frequently takes place in cases of threatened apoplexy or cerebral congestion. It is generally very remarkable as a precursory symptom in measles.

Hiccough is a momentary convulsive motion of the diaphragm, accompanied by a closing of the glottis, which prevents the admission of air into the chest. It is generally symptomatic, and frequently produced by slight irritation of the stomach: but when it occurs in the course of inflammations of the abdominal viscera, in hernia, or in obstruction situated in the intestinal canal, it is considered a symptom indicative of danger in proportion to its violence.

Cough consists of several violent quick and frequent expirations, accompanied by different sounds, produced by the air passing through the larynx. Magendie has remarked that a phenomenon which always accompanies cough is a momentary closing, or, at least, a perceptible narrowing of the glottis; this not only assists in the production of the peculiar noise accompanying it, but in addition opposes the passage of the air, which at last escapes with greater rapidity, and more easily forces out the mucous matters collected in the different passages.

Cough is idiopathic or symptomatic, depending not only on affections of the respiratory, but also upon those of other organs, unconnected with the act of respiration. Laennec remarks that in some cases of dry catarrh there is only a slight cough, altogether dry, and sometimes so infrequent, that a person may scarcely cough once in twenty-four hours, or even in two or three days; occasionally, however, this dry barking cough is not only very frequent, but very harassing. This cough, when the dry catarrh has come on slowly, and not preceded by acute catarrh, is known to many practitioners under the name of *nervous cough*. Very often this is considered to be sympathetic, and its cause has been ascribed to some real or supposed affection of the stomach, liver, kidneys, or uterus; hence the names gastric, hepatic, and hysteric cough, which only, however, indicate the co-existence of a dry catarrh, with an affection of some other organ. This cough often ceases during the summer, because the increase of the cutaneous transpiration diminishes the quantity of blood in the bronchi and the secretion "of the pearly sputa."

Cough accompanies affections of the liver, in consequence, probably, of the connexion of this organ with the diaphragm, and that it should be occasionally met with in disorders of the primæ viæ may perhaps be accounted for, by the irritation which in these may arise about the fauces, and induce cough by exciting the action of the glottis. But in some instances we observe it attending affections apparently unconnected with the respiratory organs, except inasmuch as these may be sympathetically affected, and relieved in proportion as the state of health is improved; thus it is not unfrequently seen in chlorotic cases, disappearing with the other symptoms under the use of tonics, &c. In the great majority of cases, however, it must be considered an idiopathic affection, depending upon the state of the respiratory organs. It may be induced in any person in perfect health, exposed suddenly to cold air, or the inhalation of any gas or irritating substance. It may accompany acute or chronic diseases of the organs contained in the chest, or it may proceed from affections of the larynx and trachea, when it has been termed *guttural*, and it may be dry or attended by more or less expectoration; at the commencement of inflammatory affections of the lungs or pleura, or of the mucous membrane lining the air passages, the cough is dry. Phthisis, too, commences with a small dry cough, which may go on for some time, exciting perhaps but little attention; sooner or later, however, a copious expectoration comes on, and the quantity thus brought up is generally very large. Cough varies much in the degree of pain which attends it, in the ease or difficulty with which it takes place, as also in its intensity and frequency. In some cases it is almost incessant, and produced by the slightest exertion, while in others, it occurs in paroxysms, after longer or shorter intervals; of which we have a remarkable instance in hooping-cough, when the paroxysms, often of great violence, will continue for a quarter of an hour or more, and consist of

a number of quick loud coughs, so rapidly succeeding each other that scarcely any inspiration can be observed between them; but at intervals the cough is interrupted suddenly by a deep, almost convulsive, noisy inspiration, which characterises this disease. The sound, or intonation of the cough, varies in different affections; in some, it is so peculiar as to enable us at once to recognise the nature of the disease on which it depends. Laennec has applied auscultation to it, and considers that when the lungs are quite healthy, the cough does not give any peculiar sound in the lung; the shock given to the walls of the chest is easily perceived, as also a quick expiration, but, perhaps, less noisy than the natural expiration. When heard on the larynx or trachea, and in persons with narrow chests at the root of the bronchi, it gives, besides the shock, the idea of a cavity, or of air passing through a tube. This becomes much more evident, when the lungs are inflamed to the degree of hepatization, when he gives it the name of tubular cough (*toux tubaire*); it is often remarked in cases of dilatation of the bronchi.

The different varieties of râles are generally more perceptible when the patients cough, than when they breathe; it is well, therefore, in cases where these are obscure, to desire them to cough. The metallic tinkling is often heard in coughing, when the voice and respiration do not give it. Where tuberculous matter has only begun to soften in the cavities, and in the commencement of abscess, the result of inflammation in the lung, the breathing is often not sufficiently strong to cause the air to penetrate and produce the rattle, but the cough will induce a strong gurgling. The cough, too, by clearing out the mucus and sputa, which have produced a temporary obstruction, from the bronchi, will render perceptible a rattle, which had ceased for a time. "One of the most useful cases in which to make a patient cough, is in that variety of dry catarrh," says Laennec, "wherein the respiratory sound is inaudible under ordinary circumstances; cough being always preceded or followed by a deep inspiration, which is heard better than the others, and allows us to judge of the degree of permeability possessed by the pulmonary texture."

The act by which the different matters contained in the bronchi and trachea are expelled, is named *expectoration*, and it may take place in two different ways. When the bronchi contain only a moderate quantity of matters to be expectorated, the pectoral cough takes place one or two times, and brings them up into the pharynx, from whence they are passed into the mouth, and thence spit out. When a great quantity of fluid is suddenly or quickly poured into the bronchi, as for instance, in some cases of hæmoptysis, or where an aneurismal sac, or the pus in empyema, breaks into the air passages, the expectoration resembles vomiting; the lung being firmly compressed by an almost convulsive contraction of the expiratory muscles, transmits this compression to the bronchi, the liquid which fills them escapes by the glottis, and flows abundantly from the mouth, and sometimes, even by the nostrils. Expectoration gene-

rally takes place in young children, in this latter way, and succeeds to a smart fit of coughing; but frequently, they swallow the matters brought up into the mouth by the efforts of the cough, which are then either thrown off from the stomach by vomiting, or pass through the intestines.

Expectoration takes place with ease or with difficulty, it may be suspended or suppressed, and in some instances, become impossible. Sometimes it follows readily after a slight cough; at other times, even after a smart fit of coughing, it requires repeated efforts of hawking to bring up and discharge the matters to be expectorated. When great debility is present, and when the powers of life are fast sinking, the capability of making the necessary efforts for expectoration is lost, and hence, the peculiar r le, the death rattle, as it is called. In some instances, it is attended by pain, as in inflammation of the tonsils or larynx, &c.

The matters thus brought up are of great importance, since they differ in their origin and in their characters. Thus, they may be formed on the surface of the mucous membrane, or be the product of disease situated in the substance of the lungs, or in other parts, between which and the bronchi, a preternatural communication has been established. They vary considerably in *consistence*, in different, or even during the progress of the same affection. Thus, at the commencement of catarrh, they are thin and watery, becoming gradually thicker as the disease arrives at a later period; some whitish semi-opaque portions are then observed in them; these assume a yellowish tint, which becomes gradually more apparent, and mixed with a greenish tint. In pneumonia, the sputa are, in many instances, quite characteristic, being so glutinous as to adhere to the vessel in which they are received, so that it may be inverted without their being detached from it. Their *form* also varies; generally it is roundish, but when they are viscid and adhesive, it becomes more or less elongated. Sometimes, when received into a vessel, they remain distinct from each other, and are almost hemispherical in form; in other cases, they are soft, flat, and form one entire mass. Their colour is also different, and may be white, yellowish, greenish, brown, black, &c. Laennec remarks, when speaking of their appearance in pneumonia, that their colour often presents the different shades of red, and particularly of iron rust, or even a sea green, fawn colour, orange, saffron, yellow, or dark green. These different colours are frequently mixed in *str e* in the sputa, collected in one vessel, and are owing to the admixture of blood which exists in different quantities, and in a state of more or less intimate combination with the matters expectorated. "The shades of green," he adds, "even seem to me owing to the same cause, although they would characterize the bilious sputa of Stoll and his disciples. I have seen them often in pneumonia, unaccompanied by any bilious affection, yet, in other cases, I have seen the green, or yellowish green colour, disappear after bilious evacuations."

The matter expectorated is sometimes black, but this may be the case in perfect health, and, perhaps, occasionally be owing to the introduction of various substances disseminated through the atmosphere, as dust, or smoke, into the air-passages, but it is found even in persons who reside in the country, and in places where such admixture of sooty particles cannot be considered as capable of producing it, and is attributed to the black pulmonary matter found in the bronchial glands.

The *odour* of the sputa is sometimes very offensive, as in gangrene of the lungs, in phthisis, and even in some cases of chronic mucous catarrh. Their taste is of little consequence; generally, in hæmoptysis or phthisis, it is sweetish, and in catarrh, it is sometimes sharp or saline.

The differences already noticed should be attended to, but it is more important to ascertain the *composition* of the sputa, and whence they proceed; whether, when purulent in appearance, they really contain pus, or consist only of mucus having that appearance, and whether this pus can be considered as the product of softened tubercular matter, of abscess, of an affection of the mucous membrane, &c. The sputa may contain blood, and it is indispensable to ascertain, if possible, whence this proceeds. This blood may appear in greater or less quantity, more or less pure, or mixed up with other matters, merely tinged, or almost wholly composing them, or marking them in striæ. It may proceed from the nose, from the mouth and gums, or from the lungs and bronchi. If from the nose, it generally follows epistaxis, it is pure, and unaccompanied by any symptom of affection of the chest. The same may be remarked when it proceeds from the posterior part of the mouth, from the velum pendulum, or tonsils. Sometimes a small vessel gives way in these situations, which we can generally detect upon careful examination, or we find the parts red and swollen; when the blood proceeds from the gums, the sputa generally resemble a solution of gum in water, in which a small quantity of blood has been shaken and intermixed: when it comes from the bronchi, it is more or less mixed with thick mucous or puriform matters; it may, however, come up quite pure, and in greater or less quantity, of a bright vermilion colour, frothy, and towards the close of the attack often in clots. This is frequently the effect of a sanguineous exhalation from the mucous membrane of the bronchi, especially when in small quantity, and it may produce little or no general disturbance. This sort of hæmoptysis may be the effect of causes capable of inducing a sanguineous plethora, especially when these act upon the lungs; sometimes it occurs vicariously with some other hemorrhage, and at sufficiently exact periods; Laennec has seen these periodic hæmoptyses last for thirty or forty successive years. The adhesive and viscid sputa in pneumonia, are sometimes tinged or spotted with blood, arising from an exudation from the membrane lining the air-cells. Sometimes the quantity of blood expectorated is very great, especially in pulmonary apoplexy, when it may be attended

by only slight cough, the diaphragm rising as in vomiting, so that the greatest number of those who have had large hæmoptyses, say, that they have vomited blood. This is generally red and frothy, and often mixed with mucus, though it may be black and clotted. Laennec has seen a young man bring up ten pounds in forty-eight hours, and die at the end of this time; in less acute cases he has seen nearly thirty pounds brought up, in about the space of fifteen days.

Formerly, all cases of hæmoptysis were attributed to the rupture of vessels in the lungs. "It is not impossible," says Laennec, "that an aneurism of one of the branches of the pulmonary artery, or that varices of the veins, should exist and occasion hemorrhage," although he is not aware of any such fact having been described. Small hemorrhages may take place in consequence of the rupture of some small vessels, and larger and even fatal hemorrhages may follow the rupture of a vessel which traverses a tubercular excavation; aneurisms, too, may open into the trachea, into the bronchi, or into the pulmonary texture, and produce rapid death. "But," says Laennec, "in the present state of our knowledge, we may affirm that the greatest number of slight or moderate hæmoptyses take place in consequence of a simple diapedesis, or exhalation of blood on the surface of the mucous membrane of the bronchi, and that the serious cases, on the contrary, have their principal source in the vesicular texture of the lungs, and constitute that affection which is described under the title of pulmonary apoplexy."

When purulent expectoration was considered to arise from ulceration of the lungs, the cause to which consumption was formerly attributed, it became important to distinguish pus from mucus, and numerous experiments were performed for the purpose of ascertaining some sure and certain characters peculiar to each which might serve to distinguish them. The pus formed in an organ as the lung may, either, as in one stage of pneumonia, be diffused through its substance, or be collected into one or more centres, forming abscesses, from whence it gradually makes for itself a passage for escape, generally into the bronchi. These abscesses, or collections of pus in the pulmonary texture, as a result of inflammation, are rare, a thousand times more so, says Laennec, than empyema, or a collection of pus in the pleura. Whenever an abscess of the lung, or of any of the neighbouring parts, finds a way into the air-passages, purulent matter is expectorated, and occasionally we find purulent matter more or less pure proceeding from the mucous membrane of the bronchi.

"The sputa in phthisis in despite of all the efforts made at any time," says Laennec, "to find in them some pathognomic characters, have not given any result different from what we obtain from an examination of the products of the expectoration in chronic catarrh, nor has modern chemistry afforded us any certain criterion. Three different substances may enter into the composition of the

phthisical sputa,—catarrhal, mucus, tubercular matter more or less softened, and sometimes, the pus secreted by the walls of tubercular excavations when completely empty. Although pus is in general more opaque, less tenacious and more fetid than catarrhal mucus, nothing is more common than to see true puriform sputa in simple chronic catarrhs.”

Purulent expectoration is by no means, therefore, a criterion of consumption; indeed, the sputa of phthisical patients do not generally contain pus until an advanced stage of the disease, when the tubercles having become softened, form centres or abscesses opening into the bronchi, and persons may die before the tubercles arrive at this stage, from the effects produced upon the respiration and mucous membrane by them in their crude state. Purulent expectoration too, may attend other diseases of the respiratory organs, independent of any trace of tubercles of the lungs.

THE CIRCULATION.

There are few affections in which the circulation is not in some degree disturbed, and in all, the signs deduced from an observation of it are important. In the great majority of cases its affections are sympathetic; since those which can be considered idiopathic must be confined to morbid states of the heart and its appendages, which are, of course, few in comparison with the other numerous diseases to which the body is liable.

Before the writings of Corvisart, little was known of the true symptoms accompanying different organic diseases of the heart and large vessels. The application of the hand to the region of the heart, was the only means employed before the time of Avenbrugger, and this, as Laennec remarks, frequently gives no result, or may even deceive us in estimating the true force of the impulse of the heart, and less certainly indicates the regularity or anomalies in its contractions than the examination of the pulse; as he considered that percussion, also, afforded little else than confirmative or accessory signs, which may often be wanting, he applied the stethoscope to the investigation. But his pupil, M. Collin, remarks, “It may be seen after this view of the pathological phenomena furnished by the heart, that there are only two, the *impulse* and the *sound*, which are certain signs of the lesions of the different parts of this organ, that all the others deduced from the rhythm, the bruits de soufflet, de râpe, &c., have not as yet been observed sufficiently often to enable us to say what alterations they indicate. But I do not doubt that attentive observation and daily application of the stethoscope will, at some future time, furnish the desired information, and render the diagnosis of these affections as easy and precise as that of the greater part of other diseases of the chest.”

Every practitioner must wish that this expectation may be re-

alised, but it is to be feared that the advocates of the stethoscope are, in some instances, too sanguine. Many of the signs to be deduced from it depend upon slight differences in sounds, not always easily distinguished even by an experienced ear, and we often find opinions differ in minute distinctions of sound, when heard even under the most favourable circumstances. The application of the stethoscope is not always easy, it is apt to distress or alarm patients, and often from their position, their inability to change it, their great emaciation, and other circumstances, we encounter difficulties, or obtain an exaggerated result. This should not, however, deter us from its use, although it should render us cautious and equally anxious to make ourselves acquainted with all the other symptoms and circumstances of the case, as if we possessed no such auxiliary. In many cases, it may afford us only the more certain knowledge of an incurable disease, and in others, if it leads to a more accurate discrimination, it affords no more certain rules for practice; it may enable us to speak more precisely as to the particular part of the organ affected, yet not in consequence of this knowledge to modify our treatment. M. Andral remarks, "That the different signs furnished by auscultation, and indicating an organic affection of the heart, may be present, and yet no such disease exist; and, again, it is not less certain that this affection may be very severe, and yet auscultation not reveal it to us. "And," he adds, "the method of auscultation has undoubtedly thrown much light upon diseases of the heart. It gives often very useful and necessary information, and we should never neglect to have recourse to it. But alone, and without the aid of other signs, it cannot, except in some rare instances, show for a certainty the existence of such diseases, any more than it can in a very great number of cases alone discover to us the existence of tubercles in the lungs, or even acute inflammation of these organs. It is far from my wish to depreciate the method of auscultation, one of the most beautiful and ingenious discoveries which has been made in medicine for a long time. I seek, on the contrary, to render it more useful, and its application more practicable by not exaggerating its advantages, and by indicating precisely what is most deserving of attention in it."

Many affections of the heart announce themselves by the occurrence of *palpitations*, which consist of a set of quick, regular, or irregular movements of the heart, more or less strong, feeble, constant or occasional, continued or intermittent, circumscribed or extended. In some cases, irregularities may be observed in the action of the heart, independent of any palpitations. The patient feels a kind of weight or uneasiness in the præcordial region, as if some impediment was presented to the action of the heart, which appears to cease, or to be carried on feebly and slowly. Sometimes a degree of tremulous fluttering is perceived like the feeble, but quick agitation of the wings of a small bird attempting to fly.

These different sensations may be all produced, however, by

other causes than disease of the heart, as by flatulence, indigestion, nervous agitation, &c.; and Rostan remarks, that he has repeatedly observed in old people affected with hypertrophy of the heart, that they were totally unconscious of the existence of palpitations, which were evidently, both to himself and pupils, present, in a violent degree. Laennec observes, that palpitations often consist simply of an augmentation in the frequency with which the pulsations of the heart take place, their force being in no respect greater than natural; and when the hand is applied to the præcordial region, it does not perceive any thing remarkable, although the patient is convinced, from the sensation which he experiences, that his heart beats much more strongly than usual; this is particularly the case when dilatation of the ventricles exists.

In exploring the chest, Laennec recommends its division into *two* præcordial *regions*, the right and the left; the right to comprehend the space covered by the inferior third of the sternum, the left that which corresponds with the cartilages of the fourth, fifth, sixth, and seventh sternal ribs. The movements of the heart must be examined under four principal views: viz., 1st. The extent over which they may be heard by means of the cylinder. 2dly. The shock or impulse given by them. 3dly. The nature and intensity of the sound which we perceive; and, 4thly. The rhythm, or order, according to which the different parts contract.

In the healthy state, the heart, when examined between the cartilages of the fifth and sixth ribs, and at the base of the sternum, appears to correspond with only a small portion of the walls of the chest, and scarcely to extend beyond the point on which the instrument rests; sometimes it appears to be entirely covered by the cylinder, and to be deeply situated in the cavity of the mediastinum, so as to leave a vacant space between it and the sternum; and its movements, although they possess a certain energy, do not seem to communicate any impulse to the neighbouring parts. In other cases, it appears to fill entirely the anterior and inferior mediastinum, and to extend much farther than the part upon which the cylinder is applied, and its contractions, although slow, and unaccompanied by any sound, seem to elevate over a great extent the anterior walls of the chest. In a healthy person, the pulsations of the heart are only heard in the præcordial region, or the space comprised between the cartilages of the fourth and seventh left sternal ribs, and the inferior part of the sternum. The movements of the left cavities are heard under the cartilages of these ribs, while those of the right are heard under the sternum, or when this bone is short, the pulsations may extend into the epigastrium. This is important, since in disease of one side of the heart only, the examination of its pulsations will give very different results in these two situations. In very lusty people, the space over which they can be perceived is less, as it is greater in those who are thin, and in children. Whenever the pulsations of the heart become much extended, they may be heard successively in the following

places;—1st. In the whole left side of the chest; 2dly. In the right side, from the axilla to the epigastrium; 3dly. In the posterior part of the left side; and 4thly, but much more rarely, In the posterior part of the right side. The intensity of the sound is progressively less in the same order. Several circumstances independent of affections of the heart may, however, produce similar effects; thus, hepatization of the lungs, or cavities existing in them, and formed by the softening of tubercles, &c., increase the extent of space over which the pulsations are heard. Many accidental causes, also, may produce a temporary increase, as nervous agitation, a high degree of fever, palpitations, and anything, in short, which increases the frequency of the pulse.

The extent of the pulsations of the heart is in direct proportion to the thinness of its walls; the thinner they are, the more extensively are the pulsations heard, which become circumscribed in proportion to any increase in their thickness.

The pulsations of the heart give to the ear of the observer a degree of percussion, or of elevation, which Laennec terms *shock*, and this may be perceived by aid of the cylinder when it is imperceptible to the hand. The intensity of this shock is generally in an inverse proportion to the extent of the pulsations, and in a direct proportion to the degree of thickness of the walls of the ventricles. It is scarcely observable in a healthy individual; but any exertions, as walking or running, nervous agitation, palpitations or fever, generally increase it in persons whose hearts have rather thick parietes, and, of course, in those who have a disposition to hypertrophy; in which disease, it is often so considerable as to raise very sensibly the head of the observer, and even to communicate to the ear a disagreeable shock, and the more considerable the hypertrophy, the more slow is the pulsation. When it is very great, says Laennec, it appears to go on progressively; the heart seems in dilating to apply itself, at first, in a single point to the chest, then in its whole extent, when it immediately sinks again.

Generally, the systole of the ventricles alone produces it; when occasioned by that of the auricles, it seems much deeper, and consists of a sort of trembling perceived at some depth in the mediastinum, the heart appearing to withdraw itself from the ear. When the walls are thinner than usual there is no impulse, even when the pulsation is greatest. The quick motions of the heart, as observed in palpitation, produced by other causes than organic disease, differ from the shock of hypertrophy. For, in these, the heart appears to strike only with its point against the walls of the chest, producing a quick smart hard noise, like the blow of a hammer, while in the latter the ventricles seem to distend, and apply themselves to the walls of the chest in their whole extent, which yield to their pressure, and communicate to the ear a degree of elevation or raising proportionate to their force.

The alternate contractions of the different parts of the heart may be heard distinctly by the cylinder. In the natural state this noise

is double, and each stroke of the pulse corresponds to two successive sounds; the one clear, quick, and sharp, like that produced by the valve of a pair of bellows, and which corresponds to the systole of the auricles,—the other duller and more prolonged, coinciding with the beat of the pulse and with the sensation of shock just described as communicated to the walls of the chest, and indicating the contraction of the ventricles. The sounds heard at the end of the sternum are produced by the action of the right side of the heart, those between the cartilages of the ribs by the left cavities. In health, the sound of the contractions is similar and equal on both sides, but in certain states it is very different on each side of the heart. When there is dilatation with thinning of the walls of the ventricles, the sound made by them is clear and loud, and in proportion to the extent of this affection, so much resembles that of the auricles as scarcely to be distinguished from it. In hypertrophy, often no sound can be heard in the præcordial region, but only the shock can be felt, and it is difficult to distinguish the sound of the auricles, which becomes very dull and scarcely audible.

By *rhythm*, is meant the order, succession, and duration of the contractions of the heart in respect of each other.

In a healthy person, whose heart is capable of performing with freedom all its functions, when the artery strikes the finger, the ear applied to the cylinder is slightly raised by a movement of the heart isochronous with that of the artery, and accompanied by a noise a little dull, but at the same time distinct. This is produced by the contraction of the ventricles. Immediately after, and without any interval, a louder and quicker sound, resembling that of a valve, announces the contraction of the auricles; no movement perceptible to the ear accompanies this latter, which appears to follow rapidly, and even to interrupt that produced by the contraction of the ventricles. An interval of repose succeeds to this, very short indeed in duration, but well defined, and then a fresh contraction of the heart comes on, commencing with the ventricles. Laennec remarks, that “of the whole space of time occupied in these successive contractions of the different parts of the heart, one-third at most, or one-fourth, is occupied in the systole of the auricles; one-fourth, or something less, in the absolute rest; and the remaining part, one-half, or nearly so, in the systole of the ventricles.” The heart is thus not in a state of continual action, but has its alternations of action and repose.

M. Collin says, that the alterations in the rhythm of the pulsations of the heart are not uncommon, but from want of proper observations they have not yet been established as signs. They often accompany hypertrophy, dilatation of the heart, or narrowing of its orifices during the whole course of these diseases; often, also, they are only present at the latter part of these affections, but at other times these end fatally without the rhythm having manifested any irregularity.

These alterations may take place either in regard to the respec-

tive duration of the contractions of the auricles and ventricles, or in regard to their succession. The duration of the contraction of the auricles rarely varies. Alterations generally take place in the contraction of the ventricles, which may be longer or shorter, and thus produce an increase or diminution in the interval of rest. In hypertrophy the ventricles contract more slowly.

The succession of the contractions is frequently observed to be interrupted, in general, however, only for a short time, as in three or four complete contractions of the heart. Thus occasionally the contraction of the auricle apparently anticipates that of the ventricle, or the reverse takes place; sometimes after the systole of the ventricles, there occur several successive quick, and, as it were, convulsive contractions of the auricles, not exceeding in duration an ordinary contraction; and Collin remarks, that most of these changes are not perceptible in the pulse, and are not found constantly in any disease of the heart.

We often observe, in the midst of a series of equal and similar, the occurrence of several shorter and quicker contractions, after which the heart recovers its natural rhythm; in other cases, after a series of regular pulsations the heart seems to stop, and remain at rest for a period of time much longer than natural. This is considered an indication of an affection of the heart. Whenever, from the rapidity and irregularity of the contractions, we are unable to analyse them, Collin remarks that we may with certainty pronounce upon the existence of disease of the heart.

Sometimes certain new sounds are also heard, the most common of which are named by Laennec,—the bellows sound (*bruit de soufflet*), the saw sound (*bruit de scie*), and the rasp sound (*bruit de râpe*), each named from their resemblance to those produced by the puffing of a pair of bellows, the sawing, or rasping, of a piece of wood. They may be heard in the heart, or in the arteries, even at some distance from it; and sometimes in the arteries when they cannot be detected in the heart. Their cause has been variously explained, even by Laennec himself; but they are generally considered to arise from some unnatural or morbid motion in the current of the blood which may be produced by permanent changes in the circulating organs, or by a spasmodic or nervous state of them.

The valves of the heart may be diseased, and offer impediments to the free circulation. Laennec's mode of distinguishing the narrowings of the different orifices, produced by alterations in the valves, is much extolled by M. Bertin, who states that he has had frequent opportunities of verifying them, and has often been able to discover these affections with so great facility, that he does not hesitate to say, that the diagnosis in this disease may be established with the greatest certainty.

When the disease affects the auriculo-ventricular orifices, we hear during the contraction of the auricles, which lasts for a longer time than in the natural state, a very remarkable noise, resembling that made by a file upon a piece of wood, or by a pair of bellows smartly pressed together.

When the disease is situated in the orifices of the arteries (the ventriculo-pulmonary and ventriculo-aortal), we hear the same noise, but it is isochronous with the contractions of the ventricles and the pulse.

If the left orifices are narrowed, the pathognomic noise is heard more particularly in the region of the cartilages of the fifth, sixth, and seventh ribs, while, if the orifices on the right side are affected, the same noise will be heard more at the inferior part of the sternum.

Laennec also notices a purring or thrilling vibration of the heart and arteries (*frémissement cataire*), which at first he considered, with Corvisart, a sign of ossification of the valves, but which he afterwards observed in cases where no organic lesion existed. The sound to which he applied the title of *cri du cuir*, or the creaking of leather, is heard in cases of pericarditis, and produced by the opposing surfaces of this membrane, being roughened in consequence of the exudation of coagulable albumen upon them.

The deductions to be made, however, from application of the stethoscope in exploring the circulation, are yet, perhaps, not sufficiently established to warrant our entire reliance upon them; and I would refer, in addition to the writings of Laennec, Bertin, &c., to those of Doctors Williams, Stokes, Corregan, and Hope, for a full development of the present state of our knowledge on the subject.

The *pulse* merits considerable attention, although we can never expect to attain so great nicety in prognostication as Solano, who boasted that he could, by observing it, not only foretell the approach of a crisis, but even its peculiar nature.

“In the trunks and principal arterial divisions,” says Magendie, “the course of the blood is continued not only under the influence of the contraction of the arteries, but besides this it flows in jerks by the effect of the contraction of the ventricles. This jerking manifests itself by a simple dilatation of those that are straight, and by a dilatation and tendency to straighten in those which are flexuous. In general, the pulse indicates the principal modifications of the contractions of the left ventricle, its quickness, its intensity, its weakness, its regularity and irregularity. The quantity of blood is also known by the pulse. If it is great the artery is round, thick, and resisting. If the blood is in small quantity, the artery is small and easily compressed. Certain dispositions in the arteries have an influence also upon the pulse, and may render it different in different arteries.”

The pulse varies in different individuals, and at different periods of life, and according to circumstances, even in health. The natural pulse is equal, yielding, and of a moderate degree of frequency and force. About sixty-five or seventy pulsations take place generally in a healthy adult, during the space of a minute; in some only forty or thirty-six. Whytt mentions an instance where one hundred and twenty were observed in a female who was quite healthy. In infancy the pulse is generally very frequent, while in old age it

is slow. It is generally more frequent in females than in males, and its frequency is increased by exercise, after a meal, by various emotions and passions of the mind; and is diminished by repose, and other causes. The pulse in children is much more easily altered in frequency than in adults.

If the pulse only increases a little in frequency above the natural standard, no regard need be paid to this. Generally, in all acute diseases it becomes more frequent; in fevers, or in inflammation, it will rise to one hundred or more; and in some people, especially in those who have naturally a frequent pulse, even as high as one hundred and forty; and in some diseases, or in very irritable habits, it may become so frequent as scarcely to admit of being counted. Frequency is the character of the pulse most easily ascertained, since it admits of a certain measure; but taken alone it is of less consequence than when viewed in connexion with its other characters, as its degree of hardness, strength, or weakness. In all cases, however, where it arises from violence of the disease, of course there is great danger, and we must not divest ourselves of apprehension, when it originates even in the irritability of the constitution. A frequent pulse, too, may be a sign of great debility. M. Boisseau, in the *Journal Universel des Scien. Méd.*, attempts to account for this, by supposing that the heart is not sufficiently strong to contract fully, so that if it only performs half its duty, its contractions in a given time will be doubled. When the debility is very considerable, as at the close of a disease about to prove fatal, we find the frequency becoming very great, the pulse appearing convulsive or tremulous, and the number of its pulsations not to be counted.

The least frequent pulse upon record is said to have been twenty-four pulsations in the minute, and occurred in a man who appeared in other respects perfectly in health. The number of pulsations is rarely below fifty. The infrequent pulse is met with in cerebral affections, in compression, in cases where any impediment exists to the free circulation, and sometimes in cases of debility. Some persons are said to have acquired such command over their pulse, as to be able to stop it almost altogether: Cheyne, in his book on the English Malady, gives such an instance.

The best method of explaining the different states of the pulse is to consider them as they are dependent upon and indicative of the state of the heart and arteries, of which a tabular arrangement is given by Dr. George Fordyce, in his *Elements of the Practice of Physic*. Thus the *frequent* or *infrequent* pulse indicates the number of contractions of the ventricles in a minute. If the ventricle contracts strongly, it throws the blood with great force into the arteries, which are firmly distended, so that we can only with some difficulty compress them, and thus the *strong* pulse is formed. If, on the other hand, the contractions of the ventricle are weak, the blood is then propelled into the arteries with less force; they are easily compressed, and the pulse is said to be *weak*. The strong or

weak pulse, then, indicates the strength of the heart's contractions. If a large quantity of blood is thrown from the heart into the arteries at once they will be much distended, and the pulse is said to be *full*; but if a small quantity only, then the pulse is called *small*. The full or small pulse indicates, therefore, the quantity of blood thrown out at each contraction.

A small quantity may be propelled by the ventricle into the arteries, either when the ventricle does not contract completely, and of course does not entirely empty itself; or when the ventricle does not dilate or relax so as to receive more than a small quantity; or when the auricle only sends a small quantity of blood into the ventricle, because it has itself received only a limited supply.

In health, the pulse generally has each of its pulsations equally frequent, equally strong, and equally full, or each pulsation is performed in the same time, with the same force and quantity of blood. But this regularity may be disturbed and varied in several ways by disease. One pulsation may be shorter, or stronger, or fuller than another,—the time of one pulsation may be lost, so that after several pulsations have succeeded each other regularly, and while we are expecting another to observe the same time, a greater interval passes before we perceive it—there is an *intermission*, and the pulse is then said to intermit. This is generally a sign of disease of the heart, or of some impediment to the free circulation, as in some affections of the chest; but it is also met with in cases of nervous affections, in disorders of the *primæ viæ*; and to some people it is natural, and the pulse only becomes regular in disease. Irregular action of the heart is, in certain persons, a sure sign of the presence of acid in excess in the stomach; and the distinctive sign between organic and sympathetic irregularity is, that while inordinate or irregular action takes place at any time, or at all times, in the former,—in the latter it chiefly takes place during the night before or after sleep.

Laennec says, we understand by intermission a sudden and momentary suspension of the pulse, during which the sunken artery is no longer felt under the finger. The duration of these intermissions is variable, sometimes less than that of an arterial pulsation, sometimes just equal to it, and occasionally longer. He distinguishes two kinds: *true* intermissions, which consist in reality of a suspension of the contractions of the heart, and the *false*, which correspond to contractions so feebly made, that they are not perceptible in the arteries, or at all events communicate to them an impulse which can scarcely be perceived. The former are the most common, and may be found in old people whose health is otherwise good, but seldom in an adult in the vigour of life, except in diseases of the heart, particularly hypertrophy of the ventricles, and during palpitations. When examined by the stethoscope they are observed to take place after the contraction of the auricles, and they only differ from the degree of rest observed in an infrequent pulse, in their not returning after every contraction of the auricles, but only

at intervals, often after frequent contractions, or contractions irregular as to frequency; so that instead of appearing like the natural repose after the complete contraction of the different parts of the heart, they seem rather to be a sudden suspension of the circulation. The false intermissions are produced by variations occurring in the duration and force of the heart's pulsations, and admit of being easily distinguished from the true by means of the stethoscope.

The intermissions or irregularities may become so great, so unequal and variable, that we can scarcely describe the pulse. It may intermit, and the intermissions may vary in duration, and in the time of their return, sometimes regularly recurring after every four or five pulsations, and then not remarked again until after a considerable interval; its pulsations may vary in point of frequency, or of strength, or of both, and all these may occur successively, or almost in combination. The pulse may have, if the expression may be allowed, no regularity in its irregularity.

These states of the pulse already described may be considered as indicating the action of the heart, while the others are generally ascribed to the arteries themselves. In all cases it is well not only to feel the pulse at the wrist, but also to ascertain the state of the heart, and compare its pulsations with those of the arteries. Laennec remarks, that in diseases of the heart, the pulse is often weak, sometimes almost imperceptible, although the contractions of the heart, and particularly those of the left ventricle, may be more energetic than in the natural state. In apoplexy, on the contrary, a very strong pulse is found in persons whose hearts scarcely give any impulse; and these circumstances appear to him inexplicable, except upon the supposition that the arteries possess a power of action, independent of the heart.

In some instances it is well to ascertain the pulsation of the arteries in different parts of the body; thus, in affections of the head, or where we have reason to suspect them, the pulsation of the carotids should be examined. I may here remark, that the pulse should be felt upon leaving the room, or after we have been in it some time, as well as soon after entering it. The presence of the medical attendant often at the first produces some agitation, and affects the pulse. The arm in which the artery is felt should be free from any compression, and placed in a position easy to the patient, and in some instances when any peculiarity is observed, the pulse should be examined in both wrists. The agreement of the state of the pulse with the symptoms is often of great importance, enabling us to ascertain the real value of the symptoms, or to discover, perhaps, some which had been concealed or overlooked.

At first, the fingers should be laid gently on the artery, and it is best to apply three or four of them, so as to occupy a large portion of it. The little finger does not coincide with the others very well, but it serves as a support to the hand, and prevents any effort which we might otherwise make to keep the fingers together and steady, from producing pressure on the artery. Then making a gentle

pressure on the artery, so as to ascertain the degree of compressibility which it possesses, all the fingers should be raised, except one, so as to ascertain the degree of strength by the impression which the blood in returning makes upon this finger. Thus, in the oppressed pulse, when the artery is thus examined, the current of blood will be found to strike with force and rapidity upon the finger, while in the weak pulse, the impulse is gradual and feeble. Dr. Herrison has invented an instrument to measure the force of the pulse. It consists of a small glass tube, about nine inches long, fitted into a reservoir of ivory, containing a small quantity of mercury, and closed at the bottom by a fine membrane. When this membrane, which supports the mercury, is placed over the trajet of an artery, as the artery dilates, the mercury ascends in the tube, in proportion to the dilatation; and the force is thus measured, the instrument being graduated into eighty degrees.

It has been disputed whether the pulsations can vary in different arteries. A large artery beats more strongly than a small one, and the pulsations are more perceptible as the artery lies nearer to the surface, and in a thin than in a lusty person. Where the arterial pulsations cease at the wrist, they may still, in many cases, be felt in the carotids. Some altogether deny that a greater degree of frequency can be possessed by one artery than by another; since all have a common origin, and one common force applied. In certain conditions, as in inflammation, the patient may imagine that the pulse is more frequent in the parts affected, in consequence of their greater sensibility, but some writers assert that differences have been observed in the pulsations of the arteries in the wrist. Rostan, however, thinks that this may be illusory, and originate in the difficulty which we have in fixing the attention upon the two pulses at the same time, and that when it exists in reality, it may be attributed to a local alteration in one of the arteries, as thickening of its coats. If, however, we admit that the arteries possess a contractile power, we cannot, perhaps, deny that causes may sometimes so operate, as to produce irregularities in its action, and varieties in the pulsations of particular arteries.

When the arteries act strongly, the pulse is of that character which is termed *hard*, and this is generally accompanied by that appearance of the blood when drawn, which is termed the buffy coat, or crust, and which is considered as indicating inflammatory action. It is not easy to convey by words distinct ideas of the pulse: the hard pulse is compared to a cord drawn tightly, and made to vibrate, it gives a sensation of tension, accompanied by a degree of vibratory motion; while its opposite, the *soft* pulse, is easily compressed, and feels fluid and yielding.

A variety of pulse, called the redoubling, (*pulsus dicrotus*), is described as occurring where the arteries act very strongly, but it is rarely met with. It is said to consist in two contractions quickly following each other, and succeeded by an interval of some duration. It was supposed to precede hemorrhage. Lancisi states, that he

observed it in aneurism of the aorta, and some authors describe it as occurring in hydrothorax, and in ossification of the valves of the heart. If the soft pulse becomes weak, and the heart and arteries act very feebly, without much regular or marked contraction or dilatation, the pulse becomes *tremulous*.

When the artery remains distended only for a short space of time, when it strikes the finger rapidly, the pulse is said to be *quick*. A distinction is thus made between the frequent and quick pulse: in the former, the number of pulsations in the minute is greater; in the latter, the duration of each pulsation is less than natural, the artery appearing to rise and fall quickly under the finger; but in general, this distinction is useless, as the two characters are often found united in the same pulse.

We have a *large* or *small* pulse, according to the size of the arteries. The *contracted* pulse is, at the same time, hard and small, and according to the quantity of blood circulating in the arteries, it becomes full or empty. Where the artery seems much distended, its contractions appear to be impeded, and its action sluggish, constituting the *oppressed* pulse. When no impediment exists to the free circulation, the blood passing readily on its course, we have the *free* pulse; but where any obstruction exists, as in the capillary vessels, the artery remains distended longer than natural, the blood appears to pass less freely, and the pulse is called *obstructed*. The paroxysm of an intermittent illustrates these; during the cold, and at the commencement of the hot fit, the pulse is full and obstructed, but as the sweating comes on, it loses this character and becomes gradually free.

It is always necessary in our examination of the pulse, to ascertain the combination of characters which it exhibits. Thus, a strong, full, frequent, and quick pulse, indicates inflammatory action, and considerable power in the patient, but if the pulse be frequent, yet small and weak, although it indicates debility, it by no means contradicts the presence of inflammation; and will sometimes, when depletion has been employed, become fuller and stronger, or rise after bleeding, as the expression is. In cases where the *pulsus fictitius debilis*, as Laennec terms it, is found, he recommends the application of the stethoscope, and in all cases where the contraction of the ventricles of the heart possess energy, he states that bleeding may be employed with advantage, and the pulse will rise after it, but where the contractions of the heart are weak, although the pulse retains a certain degree of strength, it must be avoided, or only cautiously employed. In judging of the pulse, we must also take into consideration the age and state of the patient, comparing, if possible, its present with its ordinary character, or with that which we have observed it to assume in former attacks of disease, and ascertaining how far it may have been influenced by accidental circumstances. In old people, for instance, the pulse may appear hard from the altered state of the arteries.

CAPILLARY AND VENOUS SYSTEM.

“The blood,” says Magendie, “is naturally homogeneous from the left ventricle to the last divisions of the aorta, but arrived at the smaller divisions its elements separate; at least, there exists a great number of parts, such as the serous membranes, the cellular texture, the tendons, aponeuroses, fibrous membranes, &c., into which the red part of the blood is never seen to penetrate, and the capillaries of which only contain serum. This separation of the elements of the blood takes place only in a state of health, and when the parts above mentioned become diseased, it often happens that their small vessels contain blood possessed of all its characteristic properties.”

Several important functions take place in the capillary system, as *secretion, exhalation, nutrition*,—and it forms the connecting link between the arterial and venous system. The capillaries are found in all the organs, and in such a manner, that we can scarcely suppose any portions of them so small as to be without these vessels. In many organs, even in a state of health, the capillaries are partly traversed by the blood, and partly by different fluids which are colourless, varying in their proportions in different textures. The capillary system, according to Bichat, is developed in any part, in proportion to the functions which it has to perform, and many circumstances may occur in health as well as in disease, to fill, more or less, this system of vessels by determining a greater or less quantity of blood to it. The blush of health quickly succeeding any moral impression, and the highly reddened surface of a membrane naturally colourless, in consequence of inflammation, are familiar instances. Independent of exhalation and the hemorrhages which occur as the result of exhalation in mucous membranes, the secretions, and the different signs deduced from errors arising in these functions of the capillaries, it may be remarked that a variety of affections may be produced by a mere stagnation of blood in them, or by its effusion into the surrounding cellular texture. Some of these phenomena, as the livid spots, the passive hemorrhages which, generally, are observed in debilitated persons, and many serous effusions, are the result of debility, while the active hemorrhages, various affections of the skin, and some serous effusions, are considered as signs of increased action in the capillary system.

The capacity of the venous system exceeds that of the arterial, and would appear liable to variations under certain circumstances. When observed in different persons, or even in the same individual, at different periods, the volume of the veins may, at one time, appear double of what it has been at some former time; thus, in some instances, we can scarcely distinguish veins, even in those whose integuments are sufficiently transparent, while at another time they will stand out full and prominent. Magendie attributes the power which the veins have of diminishing in size, when the column of

blood decreases, to their elasticity, yet he has often seen in living animals the veins empty without their being contracted,—and, at other times, he has observed that the column of liquid did not nearly fill the cavity of the vessel. Many causes may operate upon the venous blood, so as to prevent or impede its course; thus, the veins may suffer too great pressure in different positions of a part, or in consequence of other bodies pressing upon them. Rostan considers that the degree of velocity of the blood in the venous system must always correspond with that of the arterial. This may be the case in some measure, but acceleration of its velocity in the arterial, may tend only to produce greater fulness and distension of the veins; “especially if,” as Dr. Alison remarks, “from the smaller capacity of the arteries, and from the pretty uniform distension on the whole, of all parts of the vascular system, it follows, that the velocity of the blood in the veins must on the whole, and in the same proportion, be less than in the arteries.”

In *plethora*, we find general turgescence of the body, and particularly of the veins; and it has been named according to the supposed cause upon which it depends; as, 1. *Plethora ad molem*, where the blood is really in excess, so as to incommode the vessels containing it by too much distension, and to exceed the wants of the system. 2. *P. ad spatium*, where there is a diminution of capacity in the vessels, without a corresponding diminution in the quantity of the blood circulating. 3. *P. ad volumen*, when it was supposed that the blood could be rarefied by heat, and thus increased in volume. This false plethora, as it is sometimes termed, often occurs in persons exposed to a high temperature, which most probably acts by exciting the capillaries, and causing a greater absorption. 4. *P. ad vires*, where the blood is in its usual or in greater quantity, but only excessive from deficiency in the power of propelling it. These distinctions are of some value, but the object of greatest importance is to ascertain the degree of general strength accompanying plethora; since we find it sometimes in connexion with a vigorous action of the whole vascular system, and, indeed, of the whole body, while in other cases the constitution appears weak, and the muscular fibre as well as the vascular system relaxed.

In cerebral congestion the veins in the neck are generally much distended. In some topical congestions the same enlargement and distension may be remarked in the veins; where, too, the principal branch is in any way compressed or obliterated, the neighbouring veins become enlarged. In pregnant women, from pressure of the uterus, in persons who are obliged to stand much, and in those who use tight ligatures above or below the knee, the veins of the lower limbs will become enlarged and irregular in shape, resembling a line of knotted tumours.

A venous pulse is described as occurring in some cases of disease, but it is not often observed. All the blood, says Magendie, which passes out of the auricle does not enter the ventricle; at each contraction of the auricle a certain quantity flows back into

the superior and inferior venæ cavæ, and the undulation produced by this cause is sometimes felt as far as the external iliac and jugular veins. This varies according to the facility with which the blood enters the ventricle; and when from obstacles existing in the lungs, or from want of sufficient force in the ventricle, it still contains much blood at the instant of dilatation, it can only receive a small quantity from the auricle, and then the reflux will be of greater extent.

THE BLOOD.

When the humoral pathology held sway, the composition of the blood was considered most important in the explanation of diseases, and now, perhaps, it is too much neglected, although it is by no means desirable that the old doctrines should be wholly revived. It has been ascertained that the blood, under all circumstances, is invariably the same. But it can scarcely be doubted, that a certain composition of the blood must be the most fitted to health. Magendie introduced into the jugular vein of a dog some drops of water, in which had been placed substances in a state of putrefaction. In an hour after the dog looked downcast and laid down, and was attacked with fever, vomiting black and fetid matter, and passing similar matters in his alvine evacuations. The blood lost the power of coagulating, and was extravasated into the different textures, and death supervened in a short time. In another dog he injected water into the veins after bleeding it, and repeated this at intervals,—in one case unto the tenth day, when the blood exhibited one quarter part of clot to three of serum: the animal had become feeble, moved himself with pain, and seemed to have lost his instinct and caressing habits,—his cerebral faculties were diminished, and he seemed stupified; in a word, he adds, he was no longer the same animal.

Observations have been made on the blood taken from persons labouring under dissimilar diseases, without any very remarkable differences having been observed. This, perhaps, proves little; the chemical analysis of animal fluids is yet imperfect, and such a difference may exist as to be capable of influencing the mode of action of this fluid upon the body, yet not to be detected by any means at present known to us. Pus, whether formed by a common phlegmon, or a variolous pustule, will be found to exhibit little or no difference when subjected to analysis, but we are aware that very different results follow their introduction into the system; and it is certainly proved by several authors, that the quantity of albumen in the blood varies considerably in diseases. In some cases, as in certain dropsical affections, it is increased so much as to have induced Drs. Blackall and Bright to use it as a guide in their treatment of this disease. MM. Gendrin and Andral conceive that it may be altered in quality as well as quantity. The watery part of the blood varies also in health, and decidedly in disease; especially

in advanced cases, accompanied with fluid evacuations, as is remarkably the case in pestilential cholera. The colour, too, is remarked to vary, becoming in some malignant diseases much darker than natural. So that it is quite a correct inference, that this fluid is subject to alterations, and that it may be the primary means of introducing disease into the constitution.

The blood, when it proceeds from an artery, flows out in a succession of jets,—from the veins, in a continued stream,—while from the capillaries it oozes out. When venous blood is extracted it forms in a short time, if left undisturbed, a soft mass which separates spontaneously into two parts, the one liquid, yellowish and transparent, called serum; the other, soft, almost solid, of a deep brown-red colour, opaque, and called cruor, clot, or crassamentum, and essentially formed of fibrine and colouring matter. The relative proportion of these, the serum and crassamentum, is observed to vary, and differences also take place in the size and firmness of the clot. The separation cannot be attributed to the cooling process, since the blood sometimes remains a homogeneous mass without any appearance of coagululum. The shape of the coagululum is generally similar to that of the vessel in which the blood is received, flat on its upper, and convex on its inferior surface. Sometimes the edges of the upper surface curl up so as to give it the appearance of a cup, and a buffy-coloured film or coat forms upon it, occasioned by the separation of the fibrine from the colouring matter, which does not depend upon its slow coagulation, but upon some peculiar tendency. This generally takes place when inflammation is present; sometimes, however, it may not, and frequently does not, appear upon the blood taken early in the disease. Something seems to depend upon the mode in which the blood is taken, since the coagululum more readily forms on that which has flowed from a large orifice, and in a full stream. If the blood is received in a succession of small vessels or cups the crust may appear only on the first portions, and generally it is more remarkable in narrow conical vessels than in those which are wider and flatter. In some cases of sudden death from suffocation, blows on the stomach, diseases of the heart, and after the most rapidly fatal diseases, such as tetanus, the blood retains its fluidity.

Only a few symptoms are offered by the lymphatic system. Thus sometimes we observe the course of these vessels marked out by a line of redness, accompanied by pain. The glands swell and become indurated from various causes of irritation. When inflammation affects the neighbouring parts, the glands swell and become very sensitive, as the cervical glands in cases of angina.

ANIMAL HEAT.

Much as this subject has engaged the attention of physiologists of all ages, still the real source of animal heat remains an unsolved

problem. The natural standard for the general temperature of the human body is stated at about 96° F. Dr. C. Thomson found it to be about 99°, and nearly, but not quite, the same on all points of the surface; and he concludes, from many experiments, that age, sex, temperament, size, or mode of life, produce no difference in it. By most writers, however, it is remarked, that the extremities are colder than the trunk; and Magendie states, that these parts are not only habitually colder than the others, but that their temperature often becomes much diminished, that of the feet and hands, in winter, being often nearly as low as 32° F.

The temperature may be much increased in inflammatory and febrile diseases. Dr. Alexander states its maximum of increase to be 112°, Dr. Fordyce 105°, and the late Dr. Gregory 104° F. This increase may extend generally over the whole body, or be confined to particular parts. Authors, highly deserving of credit, have remarked that, in some local diseases, the temperature of the affected part rises several degrees; while Magendie states, that from experiments carefully made and followed up, and in which he used very sensible thermometers, he never found the part inflamed of a higher temperature than the blood. He has observed a diseased hand some degrees warmer than the sound hand, but even this temperature was still below that of the blood.

In cases where the internal organs are inflamed, the external parts are said to become hotter than natural; thus in inflammation of the intestines, or peritoneum, the abdominal parietes become of a burning heat. The integuments of the head, particularly of the forehead, present the same elevation of temperature in inflammation of the brain and its membranes. The increased temperature of the skin, especially when the pulse is strong and frequent, is generally in proportion to the intensity of the disease which it accompanies. Rostan says, it is modified by the affected organ, so that in inflammations of the brain and its membranes, of the lungs and of the skin, it is much greater than in the other phlegmasiæ.

We have great varieties in its degrees, from slight increase of temperature, accompanied by more or less moisture on the skin, to the dry burning pungent heat of febrile or inflammatory diseases. Increased temperature may accompany diseases which are not of an inflammatory nature. Slight causes of irritation will sometimes induce it; but in these cases it rarely continues uniform, or is so generally diffused over the body, neither is the pulse so much affected. Even in febrile diseases it occasionally increases and diminishes, indicating a corresponding increase or decrease in its causes. In most febrile diseases, a degree of shivering, or sensation of cold, precedes the heat afterwards observed, often enabling us to determine the period of attack. If this shivering be repeated during the progress of the disease, it indicates an increase in the fever or relapse. In inflammatory affections, when flushes of heat succeed to shiverings, we apprehend that suppuration has commenced, if the inflammation resides in organs liable to this termi-

nation. The most remarkable variations of temperature occur in intermittent fever, in which, however, they bear no distinct proportion to each other; a severe cold stage being sometimes followed by a mild hot stage, and the reverse. And, by some writers, cases are given, in which the different stages are in part wanting, or their succession inverted; thus Cleghorn and Senac mention cases in which there was no cold fit; Frank has remarked others where the hot fit was wanting; and Dr. Jackson speaks of the absence of the sweating stage,—in these the paroxysm appeared to terminate by urine, or by stool, or went off without any appearance of a preternatural evacuation. Bursenius and Schenkinus speak of the inversion of the stages, as the cold fit occurring last. The lowest degree of temperature, remarked in the cold stage of an intermittent, is stated to be 74° F.

This disease affords the best example of *rigor*, or shivering, between which and *horripilatio*, or the sensation of a slight coldness creeping over the surface, there may be every gradation. Patients are occasionally deceived in their sensations, with respect to the temperature of their bodies; complaining of heat when it is natural, or even below the natural standard, or experiencing a sensation of cold, and even shivering, when the temperature is shown by the thermometer to be elevated. Andral states, that he has observed the temperature to be elevated, in some instances of the cold stage of intermittents. Some of these errors of perception may be referred to affections of the sensorium. In chronic diseases, the temperature is but slightly, if at all, changed, and when in the course of these affections, any material changes come on, as a degree of shivering, for instance, we may apprehend some increase in the affection, most commonly dependent on inflammatory action. In all cases, when the surface chills, and the capillary circulation fails, we suspect a corresponding failure of the bodily powers; if this occurs in combination with an acute affection, it must be referred to this cause, or to a concentration, as it were, of the force of the system upon the diseased organ.

EXHALATIONS AND SECRETIONS.

The action of certain organs which separates from the blood particular fluids is called *secretion*. Of this there are two kinds; that which takes place on an extended surface, and particularly on the free surface of different membranes, is termed *exhalation*; while that which proceeds from particular organs (glands) designed for this purpose, and furnished with excretory ducts, is especially named secretion.

The *cutaneous* exhalation, or *perspiration*, varies even in health, and in different persons. This transparent liquid is generally evaporated as soon as it comes in contact with the air, but at other times it flows upon the surface of the skin. In the first case, it is

imperceptible, and is termed insensible transpiration; in the second it is called sweat. At the commencement, and during the progress, of many chronic as well as acute diseases, the skin is dry and harsh from suppression of this insensible transpiration. In some cases, this is the consequence of increase in some other evacuations, as the urine, or alvine evacuations; but it may be independent of any such cause, and may even accompany an evident decrease in all the other secretions and evacuations. Dryness of the skin is often connected with a considerable increase in its temperature, and a peculiar state of constriction in the capillaries. It is always more or less dependent upon some source of irritation, and may be considered as indicating the participation of the general system in the local affection, except where it occurs in consequence of some other secretion being increased.

In some diseases, the cutaneous transpiration is considerably increased, and the sweating produced varies not only in degree but in its qualities, indicating either a favourable or an unfavourable change in the disease. If, in the course of any disease, a gentle, free, and general perspiration succeeds to a heated, dry, and harsh state of the skin, we may infer the disease to have diminished in intensity, especially when the heat of skin, and the force and frequency of the pulse, are diminished. But if the pulse becomes weak and feeble, the surface cold and clammy, and the sweat copious and weakening to the patient, it indicates a great degree of debility and danger; and in all cases, where no corresponding amelioration takes place in the symptoms, upon the breaking out of moisture on the skin, this change, if not decidedly unfavourable, is seldom serviceable to the patient. Partial sweats are not uncommon, as about the head or chest, and are said to indicate affections of the subjacent organs; thus in pulmonary consumption, copious sweats often occur on the chest. Many authors remark varieties in the odour, colour, and sensible qualities of this exhalation. These are, perhaps, of no great importance. Many substances taken into the stomach will communicate a peculiar odour to the matter perspired; and it has, independent of such circumstance, been remarked occasionally to have a fetid, urinous, sour or sweet odour. A peculiar odour is said to be observed in mania, and, by some authors, considered a true pathognomic symptom. Dr. Burrows states it to be quite peculiar, and that when once smelt it can never be mistaken for any other. Where it is present, for it does not appear always to attend mania, it is most easily detected upon going into the chamber of the lunatic, in the morning before he has risen, or fresh air has been admitted into it.

The *mucous* exhalations may be much changed by disease, though it is difficult to give any accurate description of these changes, since we are only able to examine them when thrown out of the body, and they are then generally more or less intimately mixed with other substances. In inflammation of a mucous membrane, it is supposed that the natural exhalation, or secretion, is at

first suppressed, then generally a thin, watery, and acrimonious discharge comes on, which, by its nature, appears to increase the inflammation; this, however, becomes gradually more consistent as the inflammation decreases, as is seen in coryza. The secretion varies much in colour and character, according to the violence of the inflammation, and when this is very severe it becomes truly purulent. It appears erroneous to consider all increased secretions from mucous surfaces, as dependent upon inflammation; many are indubitably so, but again, others may go on to a great extent, and yet appear connected with a very different state, and curable only by means which would have a tendency to increase inflammation if it were present.

It is much more difficult to describe the appearance of *serous* membranes, and the changes which take place in them at an early period of disease. Inflammation is said to diminish or suspend their exhalation, but we have no means of judging this fact accurately. We know that this exhalation may be increased, and sometimes very considerably, and that it may be so at the same time, or in succession, in almost all the cavities lined with serous membranes, or simply in a single one. This accumulation of serosity constitutes the class of affections termed dropsical, which may arise from a variety of opposite causes. Thus they may be the effect of mere debility; if the body is weak, the exhalants are relaxed, and throw out a larger quantity of fluid, and, as the absorbents may also be debilitated and relaxed, they take up a less quantity of fluid, and thus accumulation is the result. If any impediment exists to the free circulation through the veins, the exhalants will pour out a larger quantity of fluid into the cavities, or if any cause prevents the free action of the absorbents, it will of course tend to produce these accumulations. But another and very important cause is inflammation, to which in many instances, undoubtedly, is to be ascribed the occurrence of dropsical accumulations; though still I think we cannot admit it to be the sole cause. That serous effusion is one of the terminations of inflammation is proved by the occurrence of it in pleuritis, in inflammation of the peritoneum, hydrocephalus acutus, &c., and it would appear to be the result of a certain degree of inflammation, a subacute or slight one, occurring in these membranes. The fluid found varies in colour and consistence, being limpid and colourless, or opaque, citron-coloured, or reddish, owing apparently to admixture of blood. Frequently, too, we find a variety of flocculi, or even large flakes of coagulable lymph, floating in it. During life we are unable to distinguish these differences in the appearance of the fluid, unless it should be evacuated by an opening made by nature or by art, but we are enabled to ascertain its presence in the different cavities by symptoms peculiar to each, and often to decide upon the nature of the cause producing it.

One *sanguineous* exhalation or secretion, and that occurring only in the female, can be considered natural, the regular recurrence of which is essential to health. This periodical discharge varies in

different individuals, and even in the same person, at different times, without producing decided disease; though commonly, in females who naturally enjoy good health, and whose catamenia recur at regular periods, and in due quantity, some degree of uneasiness or disorder occurs when the flow is interrupted or diminished. When irregularity takes place, and continues through more than one period, when it does not occur as an occasional or accidental thing, and is not dependant upon any apparent accidental cause, we may infer that there exists some disturbance in the general health; for although in many cases this irregularity may be the primary affection, and give rise to other diseases, yet in many others it can only be considered as symptomatic. The regular flow of the catamenia, therefore, except in pregnancy, must be looked upon as a sign of health, and any irregularity in it as a symptom of some deranged state of the system, valuable, inasmuch as it perhaps first arrests the patient's attention, and induces her to seek advice. And thus in the majority of cases, we succeed best in promoting its regular return, by means calculated to remove that state upon which its irregularity seems to depend.

Accidental hemorrhages may take place from different parts of the body, most commonly as exhalations from mucous membranes, but occasionally from serous membranes, or in the parenchymatous textures. They may also occur in consequence of the rupture of an artery or vein in the organ from whence the hemorrhage flows, or in one communicating with it naturally, or as the result of disease. Hemorrhage may be primary or symptomatic, and sometimes it is difficult to decide whether it arises from simple exudation or some more serious organic injury. Generally when the blood passes in large quantities, and where it makes its appearance suddenly, we suspect that it proceeds from other causes than exhalation, in which the quantity is much less, more gradual, and generally more mixed with, or only streaking, the mucus discharged. Sometimes very singular translations of hemorrhage, called vicarious, occur, especially where suppression of some long accustomed one has taken place; thus, in females, vomiting of blood will sometimes succeed suppression of the catamenia. Hemorrhages are divided into active and passive; the first are accompanied by signs of increased action, and appear to be only an imperfect form of inflammation; while in the passive the symptoms are rather those of debility and loss of tone. The blood discharged varies in colour from a bright and florid red to a dark purple or black, and it may be more or less fluid or clotted; and if it has remained long in any cavity after its effusion, it is generally dark in colour, and loses its fluidity. In estimating the danger of any hemorrhage, much depends upon the situation from whence it flows, the quantity, and its duration, as well as the effect it produces upon the patient. A small quantity may produce in one person a much more depressing and alarming effect than a large quantity would in another.

Among the exhalations or secretions foreign to the body, but which may occur in it, as the consequence of disease, by far the

most important is *pus*, which may be produced by inflammation in all the textures, except, perhaps, the tendons and aponeuroses, but which is not commonly observed except in certain textures. It is a yellowish white homogeneous fluid, of the consistence of cream, with a peculiar odour, which sometimes, from the changes produced in it, by accidental admixtures, becomes very unpleasant, and even fetid. Its taste is sweetish. J. Hunter states the largest portion of pus to be composed of round white globules, which swim in a fluid very similar to the serum of the blood, but possessing properties which serum has not. Pus is specifically heavier than water, and its perfection seems to depend upon the large proportion which its globules bear to its other parts. Whenever any constitutional or local cause acts so as to disturb the production of true pus, the fluid becomes changed, in some measure in proportion to these morbid changes, generally becoming thinner and more transparent, partaking more of the nature of the blood, and called *sanies*. Sometimes it is of a greenish or reddish colour, as if tinged with blood, and occasionally the same pus will exhibit a variety of colours in striæ, or stripes; sometimes it is thin, with flocculi of greater consistence floating in it. If pus be slightly agitated with water, it is easily diffused in it, and after standing a few hours falls to the bottom of the vessel; but if, previous to its subsidence, says Grasmayer, a fixed alkali be added to it, it will be precipitated in a gelatinous mass. Mucus is with difficulty diffused in water, requiring strong agitation, and then forming a permanent ropy fluid. There is no difficulty in deciding between either of these fluids when in a pure state; their characters are sufficiently distinct, and we can easily observe the globular character of pus. J. Hunter employed muriate of ammonia as a test, having observed that a drop of pus united with a drop of this fluid was rendered soapy. Sir Everard Home observed, that pus was a whitish fluid, composed of globules contained in a transparent liquid, that it does not coagulate by heat, and is only condensed by alcohol; a very elaborate paper on its chemical properties, by Dr. Pearson, is contained in the *Phil. Trans.* 1809. Dupuytren considers the elastic viscid nature of mucus, which is entirely wanting in pus, as its strongest characteristic, observing, that the more pure the mucus, the more remarkable is the viscosity, which it loses in proportion as it becomes whiter and more opaque, as it approaches more to the nature of pus, until it becomes so near in its character as not to be distinguished from it. Where pus is secreted from a mucous membrane, or when ulceration takes place in an inflamed mucous membrane, it presents a different appearance, becoming more or less mixed with the increased mucous secretion, and forming a muco-purulent matter.

Pus may be exhaled on the surface of a wound or of a membrane, and when formed in organs from whence it has not a ready exit, it may either be disseminated through their substance or collected in one or more centres, called abscesses, and, though not an irritant to the surface secreting it, it may prove so to the adjoining parts. Dupuytren states, that "when the organized textures contract

inflammation, they are filled with a quantity of blood proportioned to the violence of the irritation under which they suffer." This fluid at first is enclosed in the vessels whose walls it distends, goes on accumulating with a degree of quickness which is always on the increase, until it breaks through the boundaries which contained it, and is extravasated in the solid parts of the organs, with which it combines, and renders them more compact and heavier, while at the same time their elasticity is lost, and they become so friable as to offer little resistance to ligatures, and to break upon the slightest force being applied. If this inflammatory action is not arrested or modified, the altered textures become softer and destroyed, they are mixed with the blood which penetrates them, and form a pulpy mass, which by further processes becomes changed into pus. This fluid is in the first instance formed from the solid portions of the inflamed organs, and from the elements of the blood which have entered into preternatural combinations. This is easily seen at the commencement of suppuration, the pus being at first bloody, and containing in certain organs, whose texture is not easily broken up, portions of parenchymatous substance. Thus suppuration in the liver is almost always of a reddish-brown colour, and contains portions of the parenchyma, giving it the appearance and consistence of lees of wine. At first the pus still imperfectly formed is disseminated in small points in the inflamed mass; by degrees it becomes more abundant, these points or centres increase in size, approach each other, unite, and form one single cavity, varying in its dimensions. As this process goes on, the pus is gradually freed from the colouring matter of the blood, and any remains of the organ which it before contained, it becomes gradually more homogeneous, and forms a peculiar fluid, differing in its properties from all the other animal fluids.

The membrane containing the pus, on its internal surface is free and in contact with the fluid, on the other it adheres to the surrounding parts, and is, as it were, lost in them. It varies in its consistence and thickness in proportion to the time which its contents have existed, and which has been occupied in its own formation. Its functions are not confined to mere isolation of its contents; it renews constantly the liquid, prevents any alteration in its qualities, which it modifies according to the different degrees of stimulus to which it is subjected. It connects it also with the system generally, and it is by means of this membrane that the fluid of an abscess increases or diminishes in quantity or consistence, becomes penetrated with substances introduced by regular absorption, or direct injection, into the sanguiferous system, and since purulent cysts are connected by strong sympathies with the principal centres of organization, they quickly feel the least stimulation of the viscera, and medicines directed towards them often succeed in producing the absorption of the fluid which they contain.

Suppuration, as we might naturally expect, presents different phenomena in different parts, according to their organization. Thus

in the skin, the epidermis is raised, and at first we see a limpid serosity under it, which gradually becomes opaque, white, yellow, brown, then dries and falls off. Again, when the chorion is exposed, the pus forms, and is exhaled on its surface by a peculiar and inexplicable process. On serous surfaces a kind of pus is formed, but always more or less mixed with a quantity of serosity; and in mucous membranes, after the membrane has at first become dry, the limpid fluid, which afterwards appears often in considerable quantity, gradually becomes opaque, white, yellow, greenish, thick and purulent. In cellular texture the pus collects in a centre, more or less large according to the extent and violence of the inflammation, and it gets vent by direct approach to the skin, which becomes gradually thinner; or in other cases, where the nature of the part favours it, it will travel over a considerable space before it appears likely to escape, and sometimes it is absorbed in the part in which it has been secreted, when it was formerly supposed to give origin to hectic fever. But we often see this peculiar fever independent of any such absorption, and in cases where pus even has not been formed, sometimes where the local irritation is slight but the constitution bad.

Of some of the secretions, as for instance the tears, the saliva, pancreatic juice, it is not necessary to speak. Patients are apt to shed tears profusely in hysteria, and some nervous affections. The saliva admits of being increased by disease, and as the effect of certain medicinal substances, or of any irritation in the mouth, or in the salivary glands and parts adjoining, as in dentition. A degree of salivation may occur symptomatic of affection of the stomach; but the saliva would appear to be diminished in most acute diseases, from the great dryness of the mouth and fauces.

The *biliary* secretion, so necessary for the due digestion of the ingesta, and the healthy action of the intestines, may be increased or diminished. Its passage, too, into the intestines is sometimes more or less completely obstructed by calculi, or inspissated bile, detained in the biliary ducts, and this gives rise by its absorption to the disease named jaundice. If vitiated or acrid bile flow into the intestines in any quantity, vomiting and purging are induced. Much, too much, perhaps, has been said of late, upon errors in this secretion as the cause of indigestion, and even of many other affections. No doubt can be entertained of the necessity of paying much attention to it, and perhaps many of the errors in the alvine evacuations may be attributed to it, but still many causes may operate to produce affections of the digestive organs perfectly independent of it.

The signs to be derived from examination of the *urine* are now held in less regard than formerly. Of course, in all affections of the urinary organs, it is necessary to be minute in our examination of its general and chemical characters, particularly where there is a tendency to calculous affections; in other diseases, too, of the kidneys and bladder, we should ascertain the nature of the different admixtures found in it, as mucus, blood, or purulent matter. And in all cases of disease it is important to know how far this secretion is

natural, whether it as copious as we wish, or whether it is diminished, or altogether wanting. When we find it diminished, we must bear in mind whether this may have occurred in consequence of the increase of some other evacuation or secretion, as severe purging or profuse sweating. The manner in which it is passed should also be considered, sometimes it is painful or difficult, and in some cases the urine is suppressed or retained. While in others, there is an almost constant desire to void it, the urine passing in small quantities and with pain. The general effects of suppression of urine are loss of energy and torpor in every function, proving an affection of the sensorium, and accounted for by the blood being surcharged with azote, according to Mason Good, which he considers it the office of the urine to carry off. Sir H. Haller remarks, that it has often surprised him to observe how small has been the measure of that excrementitious fluid which the frame has sometimes thrown off, and yet preserved itself harmless; but the cessation of the excretion altogether is universally a fatal symptom, in his experience, being followed by oppression on the brain.—*Med. Trans. of Coll.*, vol. vi.

In some spasmodic affections of the bladder it is voided with force, the patient being unable to retain it after he feels the desire of emptying his bladder. When a patient lies in a state of insensibility, or of great debility, it is generally passed involuntarily and without his consciousness. It often presents a different appearance when it has stood for some time from what it exhibited when just voided, different sediments may be deposited, or pellicles formed upon it, or matters remain suspended in it. When we wish to examine these accurately, the urine should be received in a transparent vessel, and allowed to stand for a few hours. The sediment varies often in colour and consistence, when of a reddish or brick-dust colour it is termed lateritious,—when resembling meal or dust it is named furfuraceous. Sometimes a quantity of mucus or blood, more or less pure, or pus, is found floating in the urine or deposited as a sediment; and we should bear in mind that in females the urine appears tinged with blood during their catamenia, and has often a mucous or muco-purulent admixture from leucorrhœa, or other discharges from the vagina and womb.

Dr. Prout divides the deposits which take place in the urine into three kinds,—1. the *amorphous*; 2. the *crystallised*, or gravel; and, 3. the *solid* concretions, or calculi. The amorphous consist of lithic acid, combined with a base generally ammonia, and denote an excess of lithic acid. Their colour is yellow, red, or pink. The yellow are the sediments, of health; the red denote feverish or inflammatory action, especially when on the decline; the pink generally indicate fever of an irritable character, as hectic,—and occur also in dropsical cases, and in chronic visceral affections, particularly of the liver. The first of these colours depends upon an ingredient of healthy urine, the pink upon purpuric acid, and the red or lateritious on a mixture of both.

The crystallised deposits are also of three kinds:—1. Lithic acid, red, the most frequent, and precipitated in consequence of the presence of a free acid in the urine, generally the muriatic, sometimes the phosphoric or sulphuric, and occasionally other acids, decomposing the saline compounds, and setting the lithic acid free.—2. Triple phosphate of magnesia and ammonia, always white.—3. Oxalate of lime, of a blackish green colour, and very rarely seen.

The urinary calculi are generally composed of four elementary substances, though presenting numerous varieties. Lithic acid and its compounds, oxalate of lime, cystic oxide, and the earthy phosphates.

Dr. Wollaston published a valuable essay on the varieties of calcula in the *Philosophical Transactions* for 1797; and the subject has been very ably treated by Dr. Marcet, in his "Essay on the Chemical History, &c., of Calculous Disorders."

ABSORPTION.

This very important function was long supposed to be performed by vessels termed absorbents, and no doubt they are very necessary agents, but later experiments prove that they are not the only ones. It has been satisfactorily shown that the function of absorption is also carried on by veins, and to a much greater extent than the small number of vessels having the character of lymphatics, which have been found to terminate in the smaller veins, can explain.

Sir Everard Home and Sir Benjamin Brodie have proved that when the great lymphatic trunks are tied in warm-blooded animals, substances taken into the stomach quickly find their way into the circulation, and may be detected in the urine; and experiments made by Magendie, Tiedemann, and Gmelin, show that odoriferous and saline substances introduced into the stomach are more readily detected by their smell and appropriate tests in the veins, on the mesentery, and the *venæ portæ*, than in the lacteals and thoracic-duct.

Magendie concludes from experiments, that all blood-vessels, whether arterial or venous, whether in the dead or living body, whether great or small, possess a peculiar imbibing property which explains all the phenomena of absorption; and as there is no part of the body, in which vessels may not be traced in greater or less quantity, so imbibition takes place upon every surface, and in every tissue. This is exemplified in the action of poisonous substances,—a strong poisonous fluid kills equally, whether it be placed in the stomach, in the rectum, in the mouth, on the mucous or serous surfaces, or on the naked skin. The absorption, however, is in proportion to the vascularity and quickness of circulation in the part. He calls absorbent vessels a romance to cover our ignorance. The pulmonary surface imbibes readily, as it is in all respects well adapted for the purpose; for here is a delicate membrane to be

traversed, and a rapid circulation from the capillaries to the central organ. Thus various medicinal substances, as iodine, prussic acid, &c., may be used in the form of vapour; and it has even been proposed to inject the same remedies, but of course in very minute doses. In this manner, too, the vapour of turpentine will affect a person passing through a newly-painted room, and the odour will shortly be perceived in the urine. The cutaneous membrane is also permeable, but in a much less degree. Animal substances, in a state of putrefaction, are so deleterious, that the least respiration of air containing this matter may produce dangerous consequences. See Magendie's Lectures in the *Lancet*.

It is, therefore, apparent that absorption performs a very essential part in the production of disease, affording a ready channel through which noxious substances may operate, and at the same time offering very effectual assistance in its alleviation and removal. The agents injuring the body through the medium of absorption, may either be external and foreign to the body, or may be generated or produced in it. The first act through the cutaneous or mucous surfaces, the skin, the lungs or stomach, and alimentary-canal: the second are the result of morbid changes in the organs or textures of the body, or in the secretions, whereby a variety of changes from their healthy qualities are produced, which render them capable, when absorbed and carried into the circulation, of producing disease.

Several circumstances favour absorption, and generally, if it is diminished in one part, it will be proportionally increased in another; thus when by perseverance in a scanty diet, a sufficient supply is not afforded to the alimentary canal, a great reduction in the bulk of the body may be effected. In many cases, too, where we can increase the excreta, we obtain a similar result. In dropsical affections, if the kidneys be made to act freely, or if a smart catharsis be induced, the accumulated fluid will often diminish, or disappear, by the increased activity thus produced in the absorbing vessels. Magendie has made some interesting experiments, tending to prove that plethora prevents or diminishes absorption, which effect, he concludes, must be attributed to distension of the vessels. Absorption may thus be increased by diminishing the quantity of blood, but this should not be carried to a great extent, for, by repeated bleedings, we may so far diminish the strength, and, at the same time, the energy necessary to the action of the absorbents, that an opposite effect to that desired may be produced, and the accumulation increase instead of diminish.

By absorption, morbid growths, pus, and various extraneous matters, occupying situations from which they have no natural means of escape, may be removed; sometimes a passage is formed for them over a considerable space, until an external opening on the surface of the body, or a communication with some natural passage, is accomplished; in this way, abscess in the liver, or lumbar abscess, may open into the intestines, and the contents pass off *per vias naturales*.

NUTRITION.

It is essential to health that the nourishment of the body should be duly performed, and that it should not err either in being excessive or defective. Errors, of either description, may be equally extended over the whole body, or confined only to particular, or even a single organ.

Rostan remarks, "a distinction which must not be overlooked, is that of the organs which are the seat of increased nutrition. The abundance of the fatty exhalation constitutes obesity. Hypertrophy more particularly means augmentation of volume in the muscular and parenchymatous organs, an augmentation which has nothing to do with the fat that accumulates in the organs, or in their periphery. Hypertrophy of the muscles is most readily understood, since it falls under the recognition of our senses. It arises from the great efforts which the organs are obliged to execute, and rarely from a congenital disposition."—Vol. i., 465.

The heart suffers from hypertrophy much more commonly than any other viscus. Whenever we find an organ much larger than natural, yet without any appearance of disease in its structure, we attribute this to hypertrophy. I have seen the spleen so much enlarged as to occupy the greater part of the abdominal cavity, and to present, during life, the appearance of enlargement of the liver; yet it was, except for its increased size in other respects, apparently natural in structure.

That the body may suffer from atrophy and wasting, abundant proofs are afforded during the continuance of diseases, especially if they be of long duration; as well as in those which are accompanied by excessive evacuations, and in which it will be often remarkable in a short space of time. A very marked case of atrophy, is that which accompanies disease of the mesenteric glands in children, where we find the abdomen tumid and prominent, while the rest of the body is wasted, the muscles flabby, and the integuments hanging loosely, and the face appearing pinched, sunk, and wrinkled, as if by old age. In cases of schirrus pylori, too, this emaciation is often great; in one man whom I attended, where all the alimentary substances, and generally his medicine, were rejected from the stomach, and in whom the orifice was found so narrowed as scarcely to admit a quill, the emaciation, during life, was carried to a very marked degree.

The *organs of generation*, in each sex, are liable to many morbid affections; but the symptoms derived from them are of little importance in diseases which are not peculiarly situated in them. Disease generally, but especially when accompanied by debility, diminishes their energy; some nervous affections, and some affections of the brain, appear to produce an opposite effect.

In the male, considerable uneasiness in the urethra, and retraction of the testicle, accompany calculous diseases and nephritis.

In the female, different mucous, or purulent discharges, producing uneasiness, excoriation, or inflammation of the parts may arise, often the result of disease in the uterine system.

PROGRESS, DURATION, COURSE, AND TERMINATION, OF DISEASES.

Most diseases assume the *continued* form, and the symptoms remain uninterrupted, from the commencement to the end of their attack; still in these, periods of exacerbation or remission may be remarked, occurring during their progress, but not observing any particular order, and consisting simply of an increase or decrease in intensity, of one or more of the symptoms.

Other diseases consist of *paroxysms*, recurring at irregular intervals, so that the patient may pass days or weeks without any attack, when some, even slight cause brings on a single, or a succession, of paroxysms, which again disappear, leaving the patient liable to a repetition of them, at some other uncertain period. This is the case in epilepsy, in hysteria, and in many nervous affections; sometimes we observe, especially in neuralgic pains, a marked regularity in the periods of intermission and attack, and the pain will return, for some time almost at one stated period, persist for a certain time, disappear entirely, and be again renewed after a certain interval of ease.

The most remarkable instance of *intermission* occurs in that peculiar form of fever which, from this circumstance has received its name of intermittent, whose paroxysms consist of three stages, a cold stage succeeded by heat terminating in sweating, and followed by a state of complete apyrexia, in which all the febrile symptoms are absent. These paroxysms are repeated at different intervals, after twelve, twenty-four, or forty-eight hours. The class of fevers also furnishes an example of another form of disease, intermediate between the continued and intermittent, in which, without any complete interval of apyrexia, there is a remarkable decrease in the symptoms, and a series of regular paroxysms succeeding these remissions at stated intervals. The remittent fever will exhibit, like the intermittent, paroxysms composed of rigor, heat, and sweating, while some of its symptoms, as in continued fever, are present during the whole of its course. A variety of causes have been assigned for the periodical return of the paroxysms, all equally inadequate to account for the fact, which is rendered still more inexplicable by the many varieties and complications which each type admits of.

Diseases vary in *duration*, and, according to this, they have been divided into acute and chronic, which terms are rather vague and unsatisfactory. A disease may be termed acute, whose symptoms rapidly increase, and whose termination is not protracted to a long period, not beyond forty days, according to most authorities; whereas in a chronic disease, the symptoms develop themselves slowly, and

continue for a longer period without any essential change occurring in them. By some writers, the terms are considered to be more correctly employed to denote the degree of intensity of the symptoms, than their duration.

Some diseases last only for a few hours, or a few days, and are named ephemeral; some even prove fatal in a less period of time, while others endure for years, or even the whole life of a patient, without appearing to possess any essential power of shortening it. Others have a fixed term of duration, as the eruptive fevers, but the duration of the generality of diseases is uncertain, and often depends upon a variety of accidental circumstances.

The *course* of diseases has been divided into different periods, as, of attack, of increase, of greatest intensity, and of decline.

The exact period of attack or *invasion*, it is often difficult to determine; the precursory symptoms, at first slight, becoming by degrees more intense. Sometimes, indeed, some remarkable symptom occurs, and marks pretty accurately the time of attack, as a degree of shivering in febrile diseases, a more or less acute pain in inflammatory affections, but in the majority of cases nothing remarkable is observed, until the disease has arrived at its first stage, which may be said to extend from the period of invasion, to the time when the disease is manifest and well marked. Some diseases, at their commencement, are marked by particular symptoms, many exhibit only those which are common to others, and which may lead us to decide upon the class to which they belong, but leave us in doubt as to their particular species. In some, as the exanthemata, it is important to know as nearly as we can the day on which the disease commenced, as it will enable us more correctly to judge of its nature and progress. In many acute diseases, as in hemorrhage, the symptoms increase rapidly, and in a few hours, perhaps, have arrived at their greatest degree of violence or *acmè*; and frequently when a disease is running on to a fatal termination, the unfavourable symptoms go on increasing to their period of greatest intensity, which lasts only a short time. This first period corresponds to what was anciently termed the state of crudity, where the seeds of disease, planted as it were in the constitution, were not yet ripened or concocted.

The second period of disease begins when the symptoms have arrived at their greatest degree of violence (*acmè*). Sometimes fresh symptoms are added to those which were previously present, or appear in their place, and in this stage death often occurs; but if the disease is to terminate favourably, the symptoms begin to decrease in violence and in number, and the third period or *decline* commences. Although these periods may be observed in some, they are far from being marked in all diseases, as they often pass insensibly into each other, and render it difficult to point out the peculiar limits of each. Many circumstances modify the progress of diseases, some acting only on a single individual, others upon many at the same time, and producing similar effects in each. Diseases, especially those which are violent in character, are generally more rapid in

their progress, and produce a more decided reaction in youth and adult age, especially in strong constitutions; but the different seasons of the year, sudden changes or alternations of temperature, particular situations or climates, modes of life, and a variety of other causes may all operate in hastening or protracting it.

The manner in which diseases *terminate* is various; some indeed would appear to arise and continue, without much change or inconvenience to the patient, unto his death, which may be occasioned by some other, and even dissimilar disease.

The great majority, however, terminate in restoration to health, or in their assuming a chronic form, in their producing some other disease, or in death.

In the first case, the symptoms decrease, and the different functions become completely re-established, sometimes rapidly, and sometimes slowly and gradually. The peculiar circumstances attending the convalescence and return to health must vary, of course, in each disease, and be characterized by an alteration or amendment of the symptoms, valuable in proportion to the importance of these symptoms in that particular disease. In chronic diseases, we naturally look for a gradual amelioration, and in many cases the progress of recovery is extremely slow, especially in those of long standing, so that in some it advances almost imperceptibly. Cases, however, do occur when some sudden change takes place, and the disease appears to go off rapidly, but generally more hopes of an eventual and permanent recovery may be justly entertained if its approach is gradual and progressive. In acute diseases, rapid changes are more common and more to be depended upon; though in these, also, a progressive recovery is generally more satisfactory, and least liable to relapses. In cases of local diseases accompanied by general disturbance in the system, that amendment is most certain, which is observed to take place at the same time, both in the local and general symptoms. The termination in death takes place both in acute and chronic cases, either suddenly or slowly. In some cases, as of hemorrhage, aneurismatic affections of the heart and large vessels, effusion into the pericardium, and some affections of the nervous system, it occurs suddenly and even unexpectedly; in others, the symptoms become more or less rapidly worse, and we are fully prepared for a fatal termination. This may be occasioned by the violence of the disease, by its effects on the system generally, or on the nervous system, by a sudden exhaustion or sinking of the vital powers, as in fever or cholera, by hemorrhage, or it may take place as a consequence of the debility in which the disease leaves the patient.

The termination in some other disease is favourable, in proportion as the disease so induced is one of greater or less importance. It has been doubted, whether one disease can be removed by another occurring in some distant part; and it is, therefore, perhaps more correct to say, that in such cases, a source of counter-irritation is established, and that an irritation of some standing yields to another

more recent. It is not unusual for an affection to leave one part and appear in another; thus, rheumatism may suddenly leave the joints and attack the heart; and vicarious hemorrhages occur on the suppression of some accustomed one, and even observe the same periods.

Acute diseases, as inflammation, may, after having acquired a considerable violence, decline to a certain degree, and there remain stationary, assuming a less acute form, and then, either gradually pass into a chronic state or produce changes in the organs of the body, which thus become affected with disease, as the consequence of the former.

The ancient writers insist much upon the doctrine of *crises* and critical days, while the moderns are inclined to treat them with disregard, and even to overlook them altogether.

“The meaning of this word crisis, or *judicium*,” says de Haen, “is taken from a legal proceeding; the patient is supposed to take his trial of life or death, it being uncertain whether the termination of the disease will be favourable or otherwise. It is, in fact, a contest or certamen between the constitution and the disease, and is salutary or fatal, as the one or the other proves the superior.” Hippocrates remarks, that “there is a crisis in a disease when it increases or diminishes considerably, when it changes into another, or ceases altogether.”

Writers have used this word in different acceptations. Some have considered it as only implying favourable terminations, others as signifying a rapid and sudden change, accompanied by some remarkable phenomena or evacuation. Much labour has been bestowed upon the subject, and upon ascertaining and describing the precursory symptoms, which may be trusted as indicating the nature, the degree, and the situation, of the critical evacuation. The humoral pathologists conceived that the morbid matter having now been duly concocted and matured, was thus thrown off, and that the disease ceased upon the expulsion of the agent which had produced and maintained it. But if this were the case, we should expect that the critical evacuation should be a constant occurrence, even, although confined, as it most commonly is, to acute diseases; whereas, if we examine the diseases detailed by the greatest advocates of the doctrine, we find that in many of them, no such appearance was observed. Thus, Chomel states, “That in forty-two observations of acute diseases recorded in the works of Hippocrates, there are found seventeen in which he observed critical phenomena; and in forty-eight cases of fever, Forestus had seen remarkable phenomena come on only in nineteen at their decline.” There can be no doubt that, in many instances, some evacuation takes place, as a diarrhœa, a copious perspiration or a flow of urine, or a hemorrhage, and that the disease after this undergoes a change; but are we warranted in concluding that this is the direct consequence of the evacuation, or may it not with equal justice be inferred that some favourable or unfavourable change having occurred, the eva-

evacuation followed as its consequence, and did not operate as its cause? It is maintained, that if this critical evacuation be impeded or stopped, serious consequences are the result; but this is also true of the natural evacuations, which do not admit of being suppressed or impeded without injury to health.

Crises are most commonly observed in the mucous membrane, where, either the natural excretion may be increased, or an exhalation of blood may take place, and much depends upon their character. Thus, if a diarrhœa occur, it will most probably be favourable, when it assumes the appearance of the natural evacuations, and unfavourable if watery or unnatural; and, in the sanguineous discharge, much depends upon the quantity, the symptoms accompanying or following it, and the part whence it proceeds.

The skin, perhaps, occupies the next place, upon which take place sweats or various eruptions. Towards the decline of most acute diseases, a perspiration, more or less copious, comes on, and unfavourable, or otherwise, according to the symptoms accompanying it.

In glands, the secretion may be increased, or enlargement and swelling may come on; and in the cellular texture, swellings, abscesses, or gangrene, may appear. The critical phenomena which come on in serous membranes are almost always dangerous, as dropsical affections, or effusion of blood, appearing during the course or decline of another disease. The crises have been named regular when announced by precursory symptoms, and happening on the proper days, and accompanied by critical phenomena; irregular, when they do not present these conditions; and complete or incomplete, as they portend a favourable or unfavourable end to the disease, or still leave the case doubtful. Hippocrates designates, as critical days, the seventh, fourteenth, twentieth, twenty-seventh, thirty-fourth, fortieth; and the fourth, eleventh, seventeenth, twenty-fourth, as indicative, because, on these, the changes are rather indicated than produced, generally by some fresh symptom, or by an increase or decrease in the violence of the disease. The third, fifth, ninth, &c., are named intercalary, and upon these, crises occur less frequently and less completely than upon the days termed critical; whereas upon the others, as the second, eighth, tenth, &c., crises rarely take place. He does not, however, appear to have implicitly relied upon this arrangement, and although he considered from observation, that changes most commonly appear on those days which he calls critical, yet, that this may happen on other days.

Many causes may operate in modifying the crisis, as age, sex, mode of life, the seasons and climate, and, perhaps, in the more temperate and equable climates, in the less artificial modes of life, and in the less actively treated diseases, more reliance could be placed upon them, and they would be more regularly observed than we have now any right to expect.

The period of *convalescence* is a state intermediate between the cessation of the disease and the complete restoration to health.

This is not without uncertainty and even danger, and varies much in duration, in proportion to the degree of violence of the former disease. Many other circumstances may also operate here as in the other periods, and exercise a marked influence. Young persons, but especially children, recover their former strength and health often with great rapidity, even after an attack of serious disease; while, as man advances nearer to old age, he will be more affected by even slight attacks, and less readily recover from their effects upon his strength. Slight causes may operate upon the convalescent, and induce a return of his disease, or give rise to some other affection. Relapses, however, are not equally common in all diseases.

The symptoms which indicate the derangement of some particular function or organ, which remain or come on at the expiration of any disease, are not to be confounded with the phenomena of a long convalescence. Generally, these are distinguishable, either from their greater intensity, or in their being affections of one function; whereas convalescence is generally accompanied by a degree of weakness or languor, in all, or the greater part of the functions. Sometimes a particular symptom may come on at the commencement of the disease, and persist for some time after its removal, or it may arise during its progress, or even at its termination. These, of course, admit of great variation even in the same disease, and may consist of affections easily removed, or of serious and organic diseases. Thus, after intermittent fevers, a periodical headache sometimes remains, observing the same type, or disease of the spleen, organic disease of the liver, or œdematous swellings may be observed.

Diseases may be either *simple* or *complicated*; and, as Chomel correctly observes, much error has arisen upon this subject, from the facility with which some writers have admitted complications, and the refusal of others to admit them. He considers as simple, 1. The simultaneous development of the same disease in several parts, or the extension of it to other parts, as inflammation occurring in the pleura and substance of the lung, at the same time, or in succession. 2. The appearance of similar diseases, at the same time, in organs more or less distant from each other, when produced by the same cause, as tubercular or cancerous disease, affecting several organs at the same time. 3. When under the influence of the same cause, affections differing from each other occur in different parts of the body, as the affection of the tonsils in scarlatina. 4. When in the course of any disease, there appears an affection which may be considered as a natural consequence of it, as peritonitis, following as a result of perforation of the intestines.

If any two diseases exists at the same time, the most important circumstance is to ascertain their influence on each other; whether when a disease supervenes on another, its effect will be to increase or diminish it. An acute disease may sometimes produce a favourable change in a chronic one, which has existed for some time, and

resisted various remedies, or it may produce the opposite effect. Erysipelas supervening upon an œdematous limb, will generally cause suppuration in the cellular texture, and even gangrene; the measles have been observed to suspend an attack of small-pox, which has after their disappearance resumed its course.

If more than one disease co-exist in the same individual, they may either exercise no influence over each other, or the supervening disease may suspend, modify, or terminate, the pre-existing disease, or it may render it more severe.

THE DIAGNOSIS

Consists in the faculty of distinguishing one disease from another. It enables us to recognize any particular one under all its forms and varieties, however obscure the symptoms may be, and to decide that it is not present in any case of an affection which may have a strong resemblance to it. This forms a very important part of our knowledge, since upon it must be formed our practice, and upon it, in many instances, the life of our patient depends. Without a correct diagnosis, our theory must be defective, and our practice uncertain. It is, however, often attended with difficulty; for not only must the simple forms of disease be known, but all their varieties and complications, and each must be viewed, not only in relation to itself and its own varieties, but also to the different other diseases, whose symptoms may bear some resemblance to its own, and with which it might be confounded. It is not then sufficient to know well one disease, or one form of disease; we must aim at a knowledge of all, and their varieties.

In order to form it, we look for the *diagnostic signs*, which comprehend every circumstance that can elucidate the nature and character of the disease, as the symptoms, the manner in which they have succeeded each other, the mode of attack, the probable causes which have induced it, and the effect, if any such have been employed, of the remedial means.

The diagnostic symptoms may be divided into proper or common, into essential and characteristic, and those which are common to several diseases.

The true or essential signs of any disease are such as leave no doubt of its existence; some of these have been named *pathognomic*, and are always present with it, being never observed except when the disease really exists. These are, however, only found in some diseases,—whereas others, characteristic of the disease, and generally present, may be absent, and yet the disease exist.

The common or *equivocal* signs are met with in most affections, and are perhaps peculiar to none, but are of value, inasmuch as they are connected with, or bear a proportion to the essential.

The signs may also be *local* or *general*; thus in pneumonia, the pain in the side, dull sound, cough and peculiar expectoration, are

local signs, depending on the organ affected,—while the heat of skin, frequency of pulse, thirst, &c., are general and sympathetic. The local signs are of great importance, especially in their combinations; since one which, when viewed in connexion with the others, becomes important, might in their absence, indicate a different disease; as the pain in the side, in this case, which under different circumstances might be rheumatic or nervous.

Independent of the positive signs of any disease, we sometimes look to the *negative*; but these are not to be depended upon, and should be received cautiously. For, although the signs generally indicating a disease may be absent, or only imperfectly developed, it is not certain that the disease may not exist.

To form a correct diagnosis many things are essential on the part of the practitioner. He should be an accurate observer, accustomed to the different forms of disease, and anxious of availing himself of every opportunity of increasing his knowledge, and of verifying his opinions by a comparison of the symptoms with the changes observed in the body after death. The life of every medical man is, or ought to be, even to its close, one of investigation and study; and although our art has undergone great improvements, our views been enlarged, and our knowledge increased, yet much still remains to be done; and most probably, as we advance in our investigations in morbid anatomy, many very interesting and valuable facts will appear, each calculated to establish or correct our present opinions, or remove some difficulty.

In investigating any disease, the observer should divest himself of all prejudice and bias, keeping his mind unshackled by preconceived theories, and permitting the appearances which he observes to suggest to him the nature of the disease under examination. The prejudiced mind, anxious for the support of one particular theory, wrests the facts to its aid, and occupied as it were with only one form of diseased action, selects such appearances only as support some preconceived opinion, discarding those which might modify or correct it. To students this is matter of much importance, and requires their serious attention.

Much depends upon the mode of *examining* a patient. Our first care should be to remark the general appearance, the countenance, the form, &c.; and, in some cases, it will be necessary to examine particularly one or more regions of the body. Thus, in many diseases, the external appearance of the chest is important, and in most cases where pain is complained of, it is highly desirable and often absolutely necessary to examine the part; in men, of course, this is attended with no difficulty, and where it cannot be dispensed with in females without risk, it may be conducted with a delicate regard to their feelings. Rostan relates a case in proof of its value: "An aged woman came into the hospital, complaining of very acute pain in the abdomen, towards the left iliac fossa. Her face was flushed, skin hot but moist, pulse strong and frequent, thirst rather great, the digestive functions were in their natural state, and

there was little or no change in the other organic or animal functions. The pain in the abdomen was sensibly increased by pressure, or upon motion." His diagnosis was formed thus:—the symptoms of reaction, namely, the strength of pulse, the colour of the face, the thirst, &c., announce a marked acute state, most probably inflammatory; the local signs show that the abdomen is the seat of the disease, but the digestive functions are natural, the inflammation cannot be situated in them; the slightest pressure produces pain, the disease is therefore superficial; motion is painful, therefore the organs of motion are affected; and he concluded that the affection was seated in the abdominal muscles, although, in old people especially, rheumatism does not occasion, in most cases, such marked general disturbance. He prescribed accordingly, and left the patient, when a pupil, having raised the clothes, came to tell him that there was a zona (an eruption so called); and he adds, "this lesson made me more satisfied than ever of the necessity of applying to the evidence of the senses as the only means of positive instruction, in all cases where it is practicable." He relates another case where fracture of the rib was mistaken for pleuropneumonia. These cases are interesting, in another point of view, as examples of his reasoning upon a case.

The chief object which a practitioner has in view, is to arrive as quickly at the knowledge of the nature of the disease and the indications of cure, as is consistent with a correct examination of the case. It is not well to be tedious in our inquiries, but we should never be hurried, and in some cases we must incur the chance of fatiguing our patient in order to acquire certainty. The best mode is to request him to relate his case; it may, perhaps, be a lengthy description, and some parts of it not interesting or connected, but our patients require, and with reason, that we should devote great attention to them, and they are generally anxious to give a minute history of their present and previous feelings and ailments. All this is very useful to us, for we can discard the extraneous matter, and seize upon some leading features which will enable us by subsequent questions to ascertain the nature of the complaint. In this way, too, we make ourselves acquainted with their previous habits and general state of health, and often gain their confidence. This is not, however, admissible in all cases; for if the brain or respiratory organs are affected, it would be improper to allow the patient to talk much or to excite himself.

In the course of our inquiries, if we find that some particular organs are affected, as those of sensation, respiration, or digestion, we must then follow up our observations by an accurate examination of the manner in which these particular organs are affected. If a patient, for instance, lies in a comatose state, we examine the state of the pupil, and observe whether it still possesses the power of contraction and dilatation. If pain in the head be complained of, we ascertain whether it is external or whether it is felt internally, whether it is affected by change of position, what is the state of

the pulse, and of the digestive functions; whether it depends, in short, upon disease affecting the brain and its membranes, or whether it is neuralgic, or symptomatic of affection of the stomach.

The degree of sensibility possessed by the different parts of the body should also be attended to; this in some cases is entirely lost, while in others it is highly increased. This latter is said to be the case in the integuments of the body, when the central parts of the brain, as the corpus callosum or septum lucidum are inflamed, and thus we might mistake this case for abdominal inflammation. In diseases of the chest we look to the seat of the pain, if any be present, the manner in which the patient breathes, the character of the cough or of the expectoration. The breathing may be slow, interrupted, laborious, intermittent, stertorous, the patient may be able to draw a full inspiration or he may be suddenly stopped in the attempt. Is the pain which it occasions, produced by inflammation or by some external affection? If we observe blood in the sputa, we must examine whence this proceeds—observing its colour, whether it is bright, red, and frothy; preceded by cough, and more or less intimately mixed with the sputa, or of a darker colour and unaccompanied by cough.

In examining the state of the abdominal viscera, much attention is generally required. If there is any pain we are guided most commonly by this to the organ affected, and by our questions we endeavour to ascertain if the disease is situated in the part which we suppose. We press upon the abdomen, and if pain is produced, observe whether it is limited or generally diffused, and if confined to the right side whether it is increased on inspiration—whether the patient has any cough—any pain in the right shoulder—can lie on the left side, whether any vomiting is present, and from his answers we judge if he labours under inflammation of the liver. If the abdomen is enlarged, we ascertain whether the tumour is hard or elastic—whether there is any fluctuation, and whether this is general or partial.

In all cases where there is pain, the patient should be desired to describe it accurately. Is it a sharp lancinating, or a dull heavy pain? Is it constant or intermittent, relieved or increased by pressure, deep seated, or confined to the integuments?

The alvine evacuations and state of the bowels are also important. Obstinate constipation may be present, and may arise from several causes,—it may be the effect of inflammation, of hernia, intromission, colic, old age, or habit. When the alvine evacuations are much increased, we must diminish them by means suited to the affection of which they are the symptom,—and when scanty and insufficient, our mode of rendering them more copious must vary with the cause. By attention to their state we are often guided in our choice of purgative medicines. If the biliary secretion is deficient, we use means to promote it.

The pulse is often affected; it may be frequent and from very opposite causes, as the consequence of increased action, and re-

quiring depletory measures, or produced by mere debility. In the one case, we shall have fulness, or strength, or hardness, or all at the same time; in the other, weakness and softness: and generally we may most safely judge by its degree of hardness or softness, for by the fulness we may be deceived, since in cases requiring active antiphlogistic treatment the pulse may be small but hard.

It is not necessary to pursue this subject. Symptoms are valuable only in proportion as we attend to their probable cause, and I have made these observations to show the mode of application of those contained in the preceding pages.

It will not be possible in all cases, at our first visit, to ascertain the real nature of the disease, more especially in chronic cases; and even in acute diseases we may be compelled to watch their progress until some decided symptom shall appear,—we must bear in mind the age, the sex, the constitution, the period of the year, and many other circumstances: some diseases, as we have seen, are more common at different seasons or ages, and much depends upon the peculiarity of constitution. Having satisfied ourselves with the affection of any particular organ, we should pass in review the others most likely to sympathize with it, and particularly ascertain in chronic diseases whether the patient does not labour under more than one diseased action.

Patients are apt sometimes, from modesty or other causes, to conceal or omit to mention symptoms of importance,—and from nervous irritability or other circumstances, to lay great stress upon trivial ones. But by careful investigation we can easily remedy this; and we should avoid as much as possible putting our questions in such a manner as to suggest the answers, for patients are apt to mislead both themselves and their attendants, not from any desire of so doing, but from alarm, and a supposition that from our inquiries we expect some particular symptom to be present, which would lead us to an appropriate treatment.

PROGNOSIS.

The art of forming the prognosis consists in being able to predict the progress of the disease, to foresee what phenomena it will present, and whether its termination will be favourable or unfavourable. Even in those who have enjoyed the most frequent opportunities for observation, whose judgment and experience cannot be questioned, this requires considerable caution; for the changes which take place in diseases are often such as might not naturally be expected, and even in a very favourable case symptoms may come on and completely change its aspect. This is often the case in fever, where I have frequently seen a purging, or sinking, or some affection of the nervous system come on (when to all appearance the patient was going on well), and the disease prove fatal.

To form a correct prognosis, it is not only necessary that the

character of the disease should be understood, its general progress, duration, and event, as deduced from the majority of cases,—but many circumstances peculiar to the individual case must also be kept in mind. One constitution will sustain a patient through a very serious disease, while another may yield to a much slighter attack. The different modifications of disease by age, sex, mode of life, and affections of the mind, must also be taken into account. Some, as inflammation, are serious, according to their seat,—and any particular symptom is rendered important by its connexion with others, and as it affects, or is affected by, the general state of the patient.

From the credit which attaches to the medical man, who has pronounced a prognosis verified by the event, and from the anxiety which the patient and his friends generally express upon this subject, some are induced to hazard their opinions in cases where the greatest caution is absolutely necessary. It is wrong to excite alarm unnecessarily; it is equally so, and certainly much more distressing, to fail to do so, where the circumstances of the case warrant it. The sordid views which may induce some men to magnify every, even slight, case into one of difficulty and danger, cannot be too severely reprobated,—while the prudent caution of an experienced practitioner should be viewed with liberality, and deemed, as it really is, the result of much observation. In most instances more is gained by openness and candour than by any attempt at mystery; and where perhaps no immediate risk is observed, yet we are anxious to be guarded in our prognosis, it is best to state fairly the reasons which influence our opinion,—and although we may not gain the reputation of medical prophets, we shall have a better right to be considered deserving of confidence, as men acquainted with the progress and changes of disease.

TREATMENT OF DISEASE.

1st. A disease, as we have seen, may go on, and by its own direct influence prove fatal: thus inflammation of the lungs may increase to such a degree as materially to impede, and eventually prevent respiration being carried on in such a way as to sustain life.

2dly. The effort which nature makes to remove the disease, may be so far from salutary that it may even prove dangerous.

3dly. A disease may prove fatal by inducing another affection of more danger than itself.

4thly. Some particular symptom may come on during the progress of the disease and destroy life, and yet this symptom may not be essential but only incidental to the disease.

5thly. Such a degree of weakness may be induced during the progress of the disease, or may remain after all the other symptoms have left the patient, that he cannot recover his strength, and dies from mere debility.

All these circumstances must be borne in mind, in order to form

a correct plan of treatment. Having endeavoured to establish our diagnosis by carefully investigating and ascertaining the essential character of the disease, we should aim to assist or correct nature in the cure by modifying the actions of the different parts so as to alleviate or cure the disease. We cannot trust to either nature or art alone, but they must mutually assist each other. Thus art may be applied to facilitate or favour actions calculated to remove the disease, to check and restrain others which may be injurious, to remove particular symptoms or obviate their tendency to produce others more serious, and to keep up the due degree of strength which may enable the patient to go through the disease, or to support the remedies which it may be necessary to employ. But if we wish to restrain any morbid action, it is apparent that we must be well acquainted with its nature, and especially with its peculiar tendency in the parts in which it is situated in any particular case. If an affection can be produced by several causes, and depend upon opposite states of the system, we endeavour to ascertain the most probable, which ought to guide our treatment. The period of the disease should be kept in mind, since a remedy very applicable in one may be improper in another stage of even the same disease. But many circumstances continually occur to modify our operations, as peculiarities of constitution, anomalous symptoms, and unforeseen changes, independent of the obscurity which surrounds the mode of action of a great portion of the substances which are employed as medicines. The reliance which we place in these is the result of experiments frequently repeated, the result, in fact, of experience which is founded upon observation and experiment. For, as Zimmerman remarks, an experiment differs from a simple observation, inasmuch as the latter appears to present itself to our notice, whereas an experiment presents us with the result of some attempt which we have ourselves made, with the intention of ascertaining whether the thing is so or not. A physician who considers every thing with attention during the course of a disease makes observations, and he who in any disease administers a medicine, and endeavours to ascertain its effects, makes an experiment,—thus the observing physician listens to nature, the experimenting physician interrogates her.

In many instances, chance or experiment has led to the use of particular medicines; in some cases, analogy has sanctioned the employment of others, resembling in their sensible qualities those already discovered. But the great majority have been tried experimentally in the diseased living body; for, as Sir Gilbert Blane correctly remarks in his *Medical Logic*, the virtues of medicines cannot be fairly essayed, nor beneficially ascertained by trying their effects upon sound subjects, because that particular condition does not exist, which they may be exclusively calculated to remove.

For some few diseases, indeed, we possess specific remedies, but the operation of by far the greatest number is relative, and their

effect depends upon the particular circumstances which accompany the case in which they are employed, and even these when employed under favourable circumstances, and judiciously, may, and do sometimes fail to produce the effect expected from their use.

Medicines may be divided into those which increase, and those which diminish power, as also into those which increase, and those which diminish action. Increased action may accompany diminished power, and again, the increase may extend to both action and power; and often in our application of remedies, this is an important consideration. In some cases, we wish to sustain or increase the strength while we restrain the action, and, frequently, we best succeed in so doing by strengthening remedies; in other cases, we wish to diminish both power and action, and this we accomplish by debilitating means.

My present purpose is not directed to the treatment or cure of diseases, but to point out what is most essential in the observation of them. It is necessary to be a correct observer, if we wish to study disease with advantage to our patients; and he is most likely to attain accuracy in observation and success in his treatment, who commences the study of pathology with correct principles and sound knowledge of the healthy body, its mechanism and functions. Anatomy and physiology are the groundwork, and chemistry, if not equally essential, is at least valuable, inasmuch as it assists us in observing and analyzing the different products of the body, and in many diseases assists us also in our practice.

It must be apparent from the preceding pages how much value should be attached to correct observation, and I cannot too strongly advocate its necessity. It would be well if clinical instruction were introduced into all our hospitals, both metropolitan and provincial, in which the instruction of pupils is undertaken, and that, in all, correct registers of disease were kept. By this means a collection of facts would be accumulated, from whence deductions might be made, valuable to the profession and to the general community. By these we could judge of the frequency or prevalence of any disease, its general progress, duration and termination, and if accurate observations were carried on in many districts simultaneously, the medical statistics of Great Britain would be materially benefited. In many instances, but more particularly in private practice, we are unable to verify our observations by post mortem examinations, so essential in most cases to a correct knowledge of the disease of which the patient has died. But it is to be hoped that, as the public see the advantage to be derived from giving up a prejudice arising often from amiable motives, that more facilities will be afforded to us, and that the feelings of the few will give way to the advantage of the many. A very interesting method; viz., the numerical has been forwarded, if not introduced by M. Louis, who, laying aside practice, has devoted his whole time, and all his faculties, to the most minute personal examination of disease as it presents itself to actual observation, attempting to form ac-

curate tables of the results which he has obtained, both with regard to the frequency of any disease, and its most common termination, as well as the ages at which it most frequently occurs, and other equally interesting particulars. It is certainly a tedious method to adopt, and, as it appears to me, not sufficiently calculated to excite the attention of students, especially at the commencement of their labours, but as a record in hospitals, it is particularly to be recommended to all who wish to advance the knowledge of disease. The advantages of this system are extolled by Dr. Hodgkin, and its principles shown in a pamphlet published by Louis on clinical instruction, which has been translated by Mr. Marten.

Great efforts are making, both abroad and in our own country, to advance medical science, and, certainly, the student of the present day has great advantages and assistance afforded to him. Several classes of disease have been accurately investigated, and sound observations made, both in physiology and pathology. It would be invidious to select names from the great galaxy of talent; but we may ask, What was our knowledge of diseases of the chest before Laennec published his observations, or of the affections of the serous or mucous membranes before the writings of some modern investigators appeared? The nervous system is equally indebted to the moderns, both abroad and in our own country; and in all cases, our practice is improved by the judicious experiments of many, based upon correct pathological observations.

Still, while we praise the more recent we should not discard the older writers, but endeavour to cull from each their peculiar excellencies. The writings of Hippocrates and Aretus, of Hoffman, and of Sydenham, are monuments of diligence in observation, and accuracy of description. The great work of Morgagni is a stupendous example of ability in the man, and was extolled by Baillie, whose own writings deservedly obtained for him approbation, both at home and abroad.

With all these advantages, however, in his possession, the observer of disease will fail, if he does not apply diligence and patient investigation. The living and dead body, in health and disease, must be his constant study, and nothing should be overlooked which can in any way advance or facilitate his acquirement of knowledge.