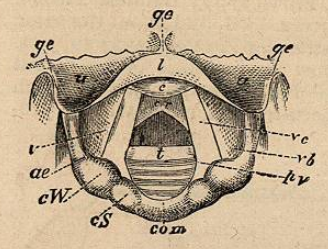
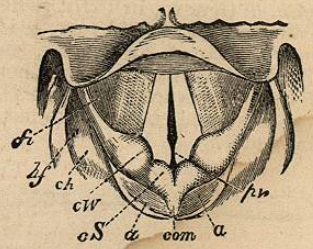
Fig. 45.



Laryngoscopic drawing, showing the vocal cords drawn widely apart, and the position of the various parts above and below the glottis during quiet inspiration. *g. e.* Glosso-epiglottidean folds. *u.* Upper surface of epiglottis. *l.* Lip of epiglottis. *c.* Cushion of epiglottis. *v.* Ventricle of larynx. *a. e.* Ary-epiglottidean fold. *c. W.* Cartilage of Wrisberg. *c. S.* Capitulum Santorini. *com.* Arytenoid commissure. *v. c.* Vocal cord. *v. b.* Ventricular band. *p. v.* Processus vocalis. *cr.* Cricoid cartilage. *t.* Rings of trachea. (Dr. Mackenzie.)

Fig. 46.



Laryngoscopic drawing, showing the approximation of the vocal cords and the position of the various parts in the act of vocalization. *f. i.* Fossa innominata. *h. f.* Hyoid fossa. *c. h.* Cornu of hyoid bone. *c. W.* Cartilage of Wrisberg. *c. S.* Capitulum Santorini. *a. a.* Arytenoid cartilages. *com.* Arytenoid commissure. *p. v.* Processus vocalis. (Dr. Mackenzie.)

The **otoscope** (for the ear), and **endoscope** (for the urethra), etc., are instruments for surgical diagnosis, not demanding description here.

The Ophthalmoscope.

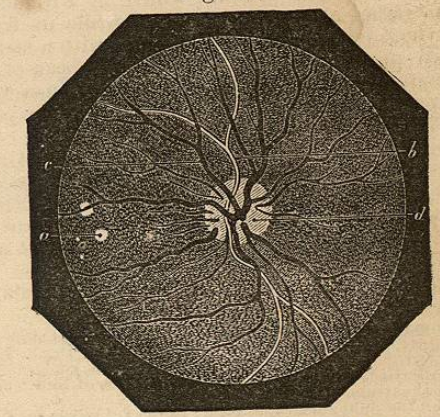
Not only for ascertaining the state of the *eye* in various disorders of vision, but also to aid in diagnosticating affections of the *brain*, this instrument has acquired importance in recent times. Essentially perfected by Helmholtz (1851), it was brought forward especially by Gräfe (1860), and has had minor improvements made in its use by Liebreich, Anagnostaki, Zander, and others. It consists of a concave circular mirror, about two inches in diameter, perforated by a small hole at the centre ; with which is used also a biconvex lens, of two or three inches focal length. The following account of the mode of its employment is from Zander :—

"In order to effect a satisfactory examination of the eye with the ophthalmoscope, it is essential to have a good light. Artificial light, as that from an oil or gas lamp, is practically the best. In preparing the patient for an examination, the pupil should be dilated by atropia : a small quantity of a solution containing one-twentieth of a grain of the alkaloid to the ounce of water having been applied to the eye several hours before. The room being darkened and the patient seated, the lamp should be placed near the head of the patient, on the same side as the eye to be examined, so far back as to leave the cornea in shadow. It is also important that the flame, the eye of the patient, and the eye of the observer should be all at the same level. The observer now takes the concave mirror in the hand that is on the side towards the lamp, places its edge against the superior margin of his orbit, and looks through the perforation at the eye to be examined ; he then causes the mirror to turn a little on its vertical axis, until the inverted image of the flame is cast upon the eye under examination, the pupil of which will then return a more or less intense reddish or whitish glow. For a general inspection of the refracting media, it will be sufficient to look at the eye from different directions, and cause it to make slight movements upwards, downwards, and to either side. If no diseased conditions be apparent, the observer proceeds to examine the inverted image of the fundus. For this purpose he takes a biconvex lens of 2″ or 3″ focal length, in the thumb and index of his free hand, rests his little finger upon the forehead of the patient, and brings the lens in front of the examined eye, so that the light from the mirror, passing through the lens, will be concentrated upon the pupil. The actual inverted image of the fundus will now be formed betwixt the lens and the eye,

Fig. 47.

Ophthalmoscope.

Fig. 48.



Representation of the appearances seen with the ophthalmoscope in a case of tubercle of the choroid. *a.* Tubercle in the choroid. *b.* Artery of the retina. *c.* Veins of the retina. *d.* Optic disk. (Bouchut.)

and in the focus of the former; and to render it visible, the observer must usually move his head somewhat further back. The first object to be sought within the eye is the entrance of the optic nerve. Sometimes before its white surface becomes visible, darker streaks may be seen traversing a bright red ground. These will be the vessels that proceed from the entrance itself, and by following one of them, in the direction of its increasing thickness, towards the inner and inferior parts of the eye, by movements of the observer and mirror in the opposite directions, the white surface of the optic disk will presently be perceived. After inspection of the nerve surface, attention should next be directed to the vessels, to observe whether they present a normal condition at their place of entrance, to note their course over the white disk, and their conduct at and after passing to the red background. After the vessels, should be observed the transparency of the retina, its relations to the choroid; and then the observer should return to a more careful and accurate study of the entrance of the nerve. Lastly follows the inspection of the refractory media, the vitreous body, the crystalline lens, the cornea, and then that of the iris."

The Sphygmograph.

Hérisson, about 1833, supported by Magendie, attracted much attention at Paris by his *sphygmometer*;[1] this was a mercurial tube, ending in an excavated hemisphere of ivory or steel, with a subjacent membranous portion made to rest upon an artery. Next came, for the visual study of the pulse, the *kymographion* of Ludwig; afterwards, King's improvement upon it by the use of a lever; then the sphygmograph of Vierordt, and lastly, that of Marey. The instrument of the latter is, undoubtedly, at the same time the simplest and the most accurate.

It consists essentially of a very delicately adjusted lever, one end of which rests upon an upright, which, by a rounded surface, presses on the radial artery at the wrist; while its free end sustains a pen, whose point is placed in contact with a strip of paper, kept in steady motion by clockwork.[2] Each beat of the pulse, therefore, magnified by the lever, is registered in a waving line upon the paper. Some observers prefer a smooth point acting upon smoked glass for the registration.

Much physiological as well as pathological interest attaches to this mode of demonstration of arterial action. It has been carefully studied by a number of able observers, especially Wolff, Naumann, Onimus and Viry, Burdon Sanderson, Anstie, B. W. Foster, and E. Holden.[3] Our present concern with it is in regard to its diagnostic use.

The marking of the normal or healthy pulse presents in regular

[1] I have before me a copy of a translation of Hérisson's memoir presented to the French Institute, published in Philadelphia in 1835 by Dr. J. G. Nancrede.

[2] Few of our instrument makers yet construct the sphygmograph. One may be imported from Paris for about $40. Otto & Reynders, of New York, manufacture the improved instrument of Dr. E. Holden.

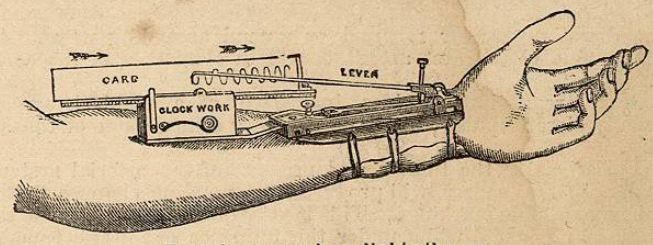
[3] Prize Essay on the Sphygmograph, 1873. Room yet exists for further investigation of the same subject in other modes. See a paper by the author, Am. Journal of Med. Sciences, July, 1868, p. 288.

succession the following parts: 1. An ascending line or summit wave; 2. A slight depression, or notch, rising very soon into a secondary wave; 3. A deep depression, or great notch; 4. A second great ascension; 5. A descending line. All authorities are not quite agreed as to the explanation of each of these portions of the curve; which admit, moreover, of some variations compatible with health. The following is probably the correct view.

1. The first ascension or summit-wave follows immediately upon the full commencement of the ventricular systole, as a "pressure-wave" (Weber), or vibratile impulse communicated to the column of blood in the vessels. 2. The secondary wave coincides with the closure of the auriculo-ventricular valves, and the forward impetus of the blood under the total pressure of the systole. 3. The "great notch" (Wolff) is due (Naumann, B. Sanderson) to the rebound of blood under the arterial contraction; the reflux which closes the aortic valves. It is sometimes called the aortic notch. 4. The second main ascension follows the closure of the semilumar valves of the aorta, the *arterial systole* then taking its full effect. 5. A descending line attends the subsidence and intermission of the pulse.[1]

By variations from these usual characters of the sphygmographic marking, evidence is given in regard to changes in—1. The force of the heart's action. 2. The tension of the arteries. 3. The existence of obstructions, anywhere, to the movement of the blood. The permanent record obtainable by means of the instrument gives great advantage for the comparative study of different cases. Hence, hospital men, especially, should value the sphygmograph.

Fig. 49.



The sphygmograph applied to the arm.

In *old age*, the pulse-mark has generally a nearly vertical but sometimes broken ascent, a rounded or flattened summit, deficiency in the *dicrotism* or second (arterial) ascent; often a sudden fall after the primary cardiac wave.

In *aneurism* of either of the great vessels, the sphygmograph affords much assistance in diagnosis. It shows a loss of force in the pulse on the side of the aneurism, with lessening of dicrotism;

[1] Galabin has asserted a *complicating* effect in the sphygmographic pulse record to be due to the oscillation of the *instrument;* but this view is not well sustained.

and, particularly, a *difference in the radial pulse-mark of the two sides* of the body.

Aortic regurgitation is attended by a *vertical* ascent of the first wave, ending in a *point*. This alone, however, is not, as Marey and others have for a time supposed, decisive; since functional disturbance of the heart may produce the same effect. There is, however, in aortic regurgitation, a notable *suddenness* in the fall that follows the pointed ascent; a collapse of the artery, without

Fig. 50.

Fig. 51.

Fig. 52.

Fig. 50. Pulse-tracing of radial artery, somewhat deficient in *tone*.
Fig. 51. Firm and long pulse of vigorous health.
Fig. 52. Pulse-tracing of radial artery, with double apex.

the dicrotic vascular rebound or second ascending wave. An *oblique* line of the first ascent occurs in *obstruction* of the *aortic* valves.

Mitral regurgitation gives indication of a small, irregular, usually dicrotic pulse; easily modified by compression of the artery.

Variations in the fulness and pressure of the arterial system, under different causes, will produce corresponding changes in the sphygmographic markings. This is very quickly shown when the pulse is registered while under the influence of inhaled vapors; *e. g.*, nitrite of amyl. In acute diseases accompanied by fever, Wolff and others have described some characteristic sphygmographic alterations; which, however, require further analysis. It is stated that, in fever, instead of the three-pointed (tricrotous) pulse, a tendency to dicrotism exists; sometimes to a single wave or monocrotism. When the aortic notch is deepened moderately, so as not to reach the line of the base of the pulse-curve, it is said to be *hypodicrotous*. If it reach that line in its descent, *perfectly dicrotous*. When it goes below it, it is *hyperdicrotous*. Changes of temperatnre are asserted to accompany these variations; the highest degree, above 104°, being found usually with the last.

Anstie has recorded, also, the effects of alcohol on the pulse as shown by the sphygmograph. He determined that, when it acts as a helpful stimulant, in typhoid states, the pulse is made slower; and excessive dicrotism is reduced. When alcohol acts as a narcotic, it accelerates the pulse and increases dicrotism.

Always, a want of uniformity and regularity in the pulse-marks, or sudden or great changes in their character, will be significant of morbid states, which may often be of serious importance. Still it would, in the case of the sphygmograph, as in that of other instruments, be a great mistake to allow it to *supersede* the use of the more simple and constantly available modes of diagnosis. The *tactus eruditus* must yet keep its place, as indispensable to every skilful physician.

Dr. Hawksley[1] has devised a "stetho-sphygmograph;" by which may be observed and recorded, not only peculiarities or modifications of the circulation, but at the same time their relations to respiration.

TEMPERATURE IN DISEASE.

The thermometer (De Haen, 1754, Wunderlich, J. Davy) is a useful aid in diagnosis and prognosis; making exact that information which every physician constantly obtains by the touch. It is especially valuable in the clinical study of febrile disorders; as, since Galen, fever is essentially defined by the words "preternatural heat."

The **axilla** is the best part for examination of temperature. Some, however (Finlayson), prefer the rectum. In children, this is probably better. The instrument should be kept there from three to five minutes at a time. Normally, in the armpit, the temperature averages 98.5° Fahr.;[2] with a range in health (Davy) from 99° to 97.92°. It is about 1° higher in tropical than in temperate climates. In the temperate, it is *highest* on waking in the early morning; lowest at midnight. In tropical regions, it is *lowest* in the early morning, and highest during the day.[3] It is one or two degrees higher in children than in adults; but in children during health, according to Finlayson, it is less in the evening than in the morning.

A rise of temperature, in disease, of 1° Fahr. corresponds, as a rule, with an increase of the pulse, of eight to ten beats per minute. The thermometer in the axilla may, in some febrile cases, mark 106°, 108°, even 112°. It has been found highest in scarlet fever, yellow fever (Dowler), and tetanus. Dr. H. C. Wood, Jr., found it 109° in the axilla of a man dying with heatstroke; and 110¾° in his abdomen, after death. Wunderlich records the temperature of 112.55° in tetanus at death, and 113.56° after death.

In intermittent fever, during the paroxysm, even when the patient shivers and feels cold to himself, his heat by the thermometer is always above the natural degree.

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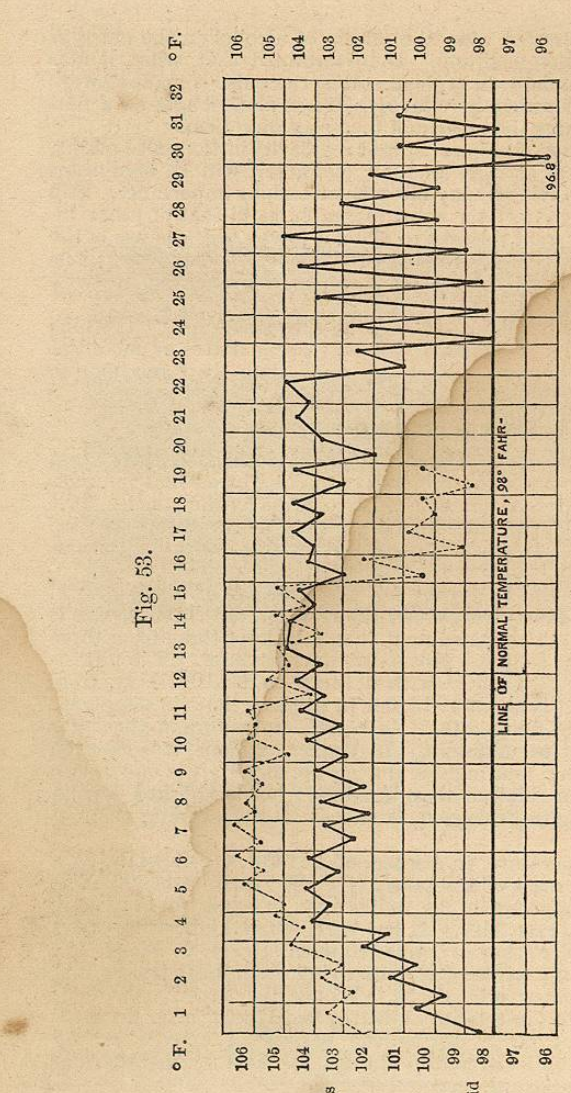
[1] Lancet, December 18, 1869.
[2] Aitken states it as 98.4°; Wunderlich, 98.6°; my own observation gives it 98.5°. F. Finlayson asserts the existence of greater variability of temperature in children.
[3] See Aitken's Science and Practice of Medicine, 4th ed., vol. i. p. 39.

Fig. 53.



Typical ranges of temperature in course of typhus and typhoid fever. The dotted line indicates the typhus range; the continuous dark line that of typhoid; the two dots under each day indicate the morning and evening temperature. (Wunderlich and Traube.)—From Aitken's *Practice of Medicine.*

"When[1] the temperature is increased beyond 98.5° it merely shows that the individual is ill; when it is raised as high as 101°–106°, the febrile phenomena are severe; if above 105°, the patient is in imminent danger; with 108° or 109° a fatal issue may without doubt be expected in a comparatively short time.

"A person, yesterday healthy, who exhibits this morning a temperature above 104° Fahr., is almost certainly the subject of an attack of ephemeral fever or of ague; should the temperature rise to or beyond 106.3°, the case will certainly turn out one of some form of malarious fever. It cannot be typhoid fever.

"A patient whose temperature rises during the first day of illness up to 105° or 106° Fahr., certainly does not suffer from typhus or typhoid fever. In a patient who exhibits the general typical signs of pneumonia, but whose temperature never reaches 101.7° Fahr., it may be concluded that no soft infiltrating exudation is present in the lung.

"If a patient suffer from measles, and retain a high temperature after the eruption has faded, it may be concluded that some complicating disturbance is present.

"In typhoid fever, a temperature which does not exceed any evening 103.5° indicates a probably mild course of the fever. 105° in the evening, or 104° in the morning, shows danger, in the third week. In pneumonia, a temperature of 104° and upwards indicates a severe attack. In acute rheumatism, a temperature of 104° is always an alarming symptom, foreboding danger, or some complication such as pericardial inflammation. In jaundice, otherwise mild, a rise of temperature indicates a pernicious turn. In a puerperal female, an increase of temperature shows approaching pelvic inflammation. In tuberculosis, an increase of temperature shows that the disease is advancing, or that untoward complications are setting in.[2]

"A fever temperature of 104° to 105° Fahr., in any disease, indicates that its progress is not checked, and complications may still occur."

Certain diseases have been found to have **typical** ranges or daily fluctuations of temperature throughout their course; so that their "differential diagnosis" may be thus assisted materially. This has now been determined, especially in malarious fever, relapsing fever, typhus, typhoid, smallpox, scarlatina, measles, rheumatism, pyæmia, pneumonia, and acute tuberculosis. Dr. Da Costa has observed that, in some cases at least, cancer is attended by a lowering of temperature.

The same assertion has been made by others in regard to diabetes mellitus. Dr. B. W. Richardson found that the narcotism produced by hydrate of chloral is always accompanied by reduction of temperature. Alcohol produces a moderate effect of the same kind. Dr. Bourneville has shown that a considerable fall occurs

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[1] Aitken, op. citat., vol. i. p. 44.

[2] The statement (S. Ringer) that rise of temperature always attends the deposition of tubercle is not exact. Wunderlich, Roger, Herard, Cornil, Jenner, and others have shown many exceptions to it. In Brit. Med. Journ., April 5, 1873, a case is reported as occurring under the care of Sir W. Jenner, in which fatal acute tuberculosis occurred *without any pyrexia.*

in uræmia.[1] Dr. Ogle reports the decided lowering of the temperature in cases of phthisis, under fifteen and twenty-grain doses of sulphate of quinine.[2] Many observations (especially in surgical fever) make it appear that large doses of quinine greatly lower the temperature. Dr. Nieden observed the temperature to be reduced after an injury of the spinal cord.

In relapsing fever,[3] the heat rises quickly in the first stage, reaching 104° or 105° on the second day; fluctuating then until the day before the defervescence, when it attains its highest point; sometimes 107° or 108°. Then it sinks rapidly, as the other symptoms subside, down to 98°, or even less. When the relapse occurs, about the fourteenth day, the heat again increases to 104°, 105°, or more; to descend as rapidly as before, when convalescence begins.

In continued fevers, the temperature is generally less high in the morning than in the evening. In typhus, however, not unfrequently it falls a little towards night.[4] Stability of temperature from morning to evening is a good sign; on the other hand, if a high temperature remains stable from evening till the morning, it is a sign that the patient is getting or will get worse.

When the temperature begins to fall from the evening to the morning, it is a sure sign of improvement; but a rise of temperature from the evening till the morning is generally a sign of getting worse.

Convalescence from disease does not begin until the normal temperature of the body returns, and maintains itself unchanged through all periods of the day and night.

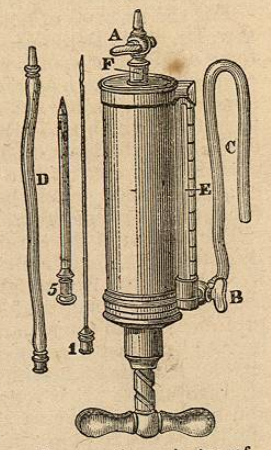
PNEUMATIC ASPIRATION.

Dr. Bowditch, many years ago, commenced the use of a fine or "capillary" trocar and canula, which, as well as the grooved needle of Trousseau, have now long been in common use for the careful exploration of any of the cavities of the body, supposed to contain fluids Dr. H. F. Walker,[5] of New York, proposed the employment of the hypodermic syringe for the same purpose in diagnosis. M. G. Palletan, in 1831, devised an instrument for the same object. But the attention of the profession has been especially given, since 1869, to the "pneumatic aspirator" of Dr. Georges Dieulafoy, of Paris. By this, it is claimed, the greatest possible safety and convenience are obtained for exploration (and also withdrawal of fluid) in pleuritic and pericardial effusions, cysts in various regions, abscesses of the liver, hydrarthrosis, retention of urine, strangulated hernia, etc. Dr. W. Pepper (1874) has employed it for the local treatment of cavities in the lungs in phthisis; and Dr. Howe, of New York, for transfusion of blood. The special claim of Dr. Dieulafoy, besides that of the fineness of his hollow needles, consists in the use of the "previous vacuum," *i. e.*, a chamber in his instrument exhausted of air *before* the introduction of the hollow needle into the part to be explored or drained.

The application of the instrument is thus described:[1]—

"The aspirator being ready, that is to say, the previous vacuum being made, the needle is introduced sharply at the spot pointed out. Before the needle has penetrated a centimetre into the tissue, that is, as soon as its opening is no longer in contact with the external air, the stop-cock connected with the needle is opened, and the vacuum is thus formed in the needle itself. This needle, carrying the vacuum with it, is slowly, very slowly, pushed in the direction of the bladder, until the urine flowing over the glass index shows that the bladder is pierced. Owing to this proceeding, and having the previous vacuum at our command, we know the precise moment the fluid is reached."

Fig. 54.



Pneumatic aspirator of Dieulafoy.

While this apparatus and method appear to involve a real improvement, capable of great utility in many cases, it must not be supposed that their employment is absolutely without danger. A few instances of fatal result, following even the introduction of the hollow needle into an articulation,[2] have enforced the necessity of caution with it. Local anæsthesia, by Richardson's spray-producer, with ether or rhigolene, has sometimes been employed to obviate the pain caused by the operation. It is not certain whether this will lessen or increase the danger of subsequent irritation.

INSPECTION OF THE BODY AFTER DEATH.

In conducting post-mortem examinations, with a view either to pathological study or medico-legal investigation, *order* and *method* are of great importance.

The three great cavities—the **head**, the **chest**, and the **abdomen**—should always be examined, whether suspicion of disease in them exist or not. First, however (the autopsy being made from twelve to thirty-six hours after death), we should note the **external appearance** of the body; its *size*, *weight*, *conformation*, *color of the skin*, etc. (In cases of suspected violence, even abrasions should be minutely described.)

To examine the **Head**, an incision should be made through the scalp, across the top of the head, from ear to ear—the two flaps thus formed should be reflected, the one over the forehead, the other over the occiput. The nature of the attachment of the occipito-frontalis muscle to the bone beneath is such, as to allow,

[1] See Hanot, Lancet, Jan. 4, 1873.
[2] London Lancet, July 6, 1872.
[3] Observations on Relapsing Fever, by Dr. J. S. Parry, Am. Journ. of Medical Sciences, October, 1870.
[4] J. W. Miller, Brit. and Foreign Medico-Chirurg. Review, Oct. 1868.
[5] See T. Gaillard Thomas, on Diseases of Women. Philada. ed., 1872, p. 663.

[1] Treatise on Pneumatic Aspiration, etc., by Dr. G. Dieulafoy. Philada. ed., 1873. The instrument has been improved upon by Potain, Steurer, and others.
[2] See Irish Hospital Gazette, Jan. 15, 1873.

very easily, the loosening of the scalp. The cranium (calvaria) is now to be removed by means of a small saw.

For the purpose of holding the head firmly during the use of the saw, Dr. T. A. Demmè has furnished, as a substitute for the craniotome of Mr. Lund, of London, a *cranium-holder*, which enables the operator to make a section of the skull in any direction. It consists simply of a bar of iron, curved like the letter U, at each extremity of which two drill screws are placed, which, when forced down upon the bone, holds the bar firmly *in situ*, and enables the examiner to control the head. The legs of the instrument, for use, are placed upon the lateral portions of the skull, over the squamous portions of the temporal bones.

The section of the cranium with the saw should be made through its outer table, completely around the head—from *before, backward*, from below the frontal protuberances to the squamous portion of the temporal bone, and from *behind forward*, from the occipital protuberance to the squamous portion of the temporal bone, meeting the line just described. The shape of the piece thus cut out enables it to be maintained in its proper position when the parts are readjusted. It is removed by the aid of an elevator, or chisel and hammer, fracturing the inner table of the skull by strokes so applied as not to pierce the brain.

The dura mater is next to be cut through, on each side of the superior longitudinal sinus; after which, dividing the *falx cerebri*, the brain may be raised carefully with the hand placed under its anterior portion. The internal carotid artery, and cranial nerves, etc., are now to be severed by the knife, and finally, the vetebral arteries and spinal cord. The brain itself may then be taken out and inspected, by slicing it from the upper part downward, in successive horizontal layers.

To examine the **Spinal column**, an incision should be made from the occipital protuberance to the extremity of the os coccygis. The deep muscles of the back should then be loosened from their attachments, so as to expose the laminæ and spinous processes of all the vertebræ. With the chisel and mallet, or saw, we must cut through the arches of the vertebræ on each side, close to their articular processes. After thus opening the spinal canal, the cord is to be exposed by dividing the dura mater through its whole length.

To examine the **Neck**, an incision should be made through the skin, extending from above the hyoid bone to the upper part of the sternum. Avoiding penetration of the large veins of the neck, the parts to be examined may be carefully dissected, and if desirable, removed from the body. The thyroid gland, larynx, and its appendages, tongue, pharynx, œsophagus, bloodvessels, and nerves of the neck, may be thus viewed.

To examine the **Chest**, two incisions are desirable; the one from the root of the neck, in front, to the extremity of the ensiform cartilage; the other at right angles to this, across the middle of the thorax. The cartilages of the ribs are to be cut through at the lines of junction with the ribs. The ensiform cartilage, being drawn outward, is to be detached from the soft parts, the knife being held *close to the sternum*. The sterno-clavicular articulation may now be opened, and the sternum with the costal cartilages

raised from its position—a cautious use of the knife being made to remove the adherent soft parts.

The thoracic viscera are now exposed, and may be drawn out with care, and inspected in detail.

To examine the **Abdomen**, make a crucial incision; the one branch extending from the sternum to the pubes, passing to the left of the umbilicus; the other transversely across the middle of the abdomen. Care must be taken, in making these incisions, not to injure the subjacent viscera.

Before removing the stomach or any portion of the intestines, ligatures should be placed above and below the part that is to be separated.

When—as is always desirable, if possible—both of the large cavities of the trunk are to be opened, a single incision, extending from the top of the sternum to the symphysis pubis, may be made.

In every case incisions through the skin should be made, as far as practicable, only in those parts which are usually covered by the clothes of the deceased. It is generally advisable, when the abdomen or thorax has been opened, to fill the cavities with bran or sawdust. After the examination has been completed, the edges of the divided integument should be brought together, and retained in apposition by the common continued suture.

MEDICO-LEGAL EXAMINATIONS.

In cases of suspected *poisoning*, the following practical directions are given by Professor Reese, of the University of Pennsylvania; to be observed by those who have charge of *post-mortem* examinations:—

1. Ascertain whether the individual has labored under any previous illness; and how long a time had elapsed between the first suspicious symptoms and his death; also, the time that had elapsed after death before the inspection is made.

2. Note all the circumstances leading to a suspicion of murder or suicide—such as the position and general appearance of the body, and the presence of bottles or papers containing poison about his person, or in the room.

3. Collect any vomited matters, especially those *first* ejected, and preserve them in a clean glass jar, carefully stoppered and labelled. The vessel in which the vomited matters have been contained should be carefully inspected for any *solid* (mineral) matters which may have sunk to the bottom, or adhered to the sides. If no vomited matters be procurable, and vomiting has taken place on the dress, bedclothes, furniture, etc., then portions of these must be carefully preserved for future examination.

4. Before removing the stomach, apply *two* ligatures beyond each extremity, dividing between each pair, so as to prevent the loss of any of the contents.

5. If the stomach be opened for inspection, this should be performed in a perfectly clean dish, and the contents collected carefully in a graduated vessel, so as to properly estimate their quantity. [Note here, also, the presence of blood, mucus, bile, or undigested food.] These contents should be preserved in a perfectly clean glass jar, securely stoppered, covered over with blad-

der, and sealed. The contents of the *duodenum* should be collected and preserved separately.

6. Carefully inspect the state of the *throat*, *œsophagus*, and *windpipe* for the presence of foreign substances, and for marks of inflammation or corrosion.

7. Observe the condition of the *large intestine*—especially the *rectum;* the presence of hardened feces would indicate that purging had not very recently taken place.

8. Note any morbid changes in the *lungs*, as congestion, inflammation, or effusion; in the *heart*, as contraction, flaccidity, presence of a clot; and the condition of the contained blood.

9. Examine the state of the *brain* and *spinal marrow;* and, in the female, the condition of the uterus, ovaries, and genital organs. [Poisons have sometimes been introduced into the vagina.]

10. Along with the contents of the stomach and duodenum, the viscera that are to be reserved for chemical analysis are the stomach and duodenum (to be kept separate from the others); the liver and gall-bladder, spleen, kidney, rectum, and urinary bladder with its contents. Sometimes, also, a portion of the *blood* may be required for the examination.

11. As the legal authorities will rigorously insist upon proof of the *identity* of the matters alleged to be poisonous, it is of the greatest importance to preserve such matters from all possible contamination by incautious contact with a surface or vessel *which is not absolutely clean*. Avoid the use of colored calico or paper for wrapping up the specimens. When once the suspected articles are deposited in the hands of a medical man, he must preserve them strictly under lock and key, and confide them only to a trusty agent for transportation. Many cases are on record where the chemical evidence failed, simply from a want of power clearly to establish the *identity* of the matters analyzed.

Actual testing for poisons in cases of suspected criminality ought to be undertaken only by those whose chemical knowledge and skill are considerable.

SECTION III.

GENERAL THERAPEUTICS.

REMEDIES have been classified, for the study of *Materia Medica*, in a manner (see *Wood's Therapeutics and Pharmacology*, or *Stillé's* or *Pereira's Materia Medica and Therapeutics*) which is perfectly well adapted to the present state of that science.

I propose the following classification, from the standpoint of the *practitioner*, *i. e.*, according to the **indications** of **treatment,** or *objects proposed.*

Thus regarded, remedies may be studied as—

Anodyne and **calmative**: *e. g.*, opium; ether; chloroform; aconite; hydrocyanic acid; hydrate of chloral.

Protective: *e. g.*, demulcents; surgical dressings.

Balancive: *e. g.*, cold to an over-vascular part; pediluvia; bloodletting.

Economic: rest; astringents; retarders of tissue-metamorphosis.

Eliminative: *e. g.*, colchicum in gout; purgatives; iodide of potassium, etc.

Antidotive: *e. g.*, hydr. ox. of iron for arsenical poisoning; antacids; cinchonization in intermittent.

Alterative: *e. g.*, nitrate of silver in scarlatinal sore throat; arsenic in skin diseases; electricity in cancer.

Recuperative: stimulants; tonics; chalybeates; oleum morrhuæ; travelling.

An elaborate work might, of course, be written upon the topics just enumerated. It is appropriate to our purpose, only to state them; dwelling, presently, upon another yet more brief classification, of the modes of treatment *most frequently called for*, in the management especially of acute and subacute affections.

First, a few words upon **balancive** measures. These constitute a very large part of therapeutics; one of the most constant elements of disease, and especially of acute diseases, being a disturbance of the *proportion* of circulation, nutrition, innervation, and action in different parts.

For example: when one "takes cold," what has occurred? Chilling the surface, as by damp air, has *checked* perspiration, *contracted* the superficial bloodvessels, causing *congestion* of interior organs, and partial contamination of the blood, from *retained excretory matter*. What, then, is the "indication" or pointing of nature?

Clearly, it is to **restore** the lost balance; by *warmth* to bring on perspiration (unless *fever* occurring demand another method); purgatives and diuretics, with plenty of water to *relieve* the blood of its morbid excess of excreta.

Again, in flatulent colic, unequal distension and spasmodic contraction of a bowel occur, from gaseous accumulation or the presence of irritating ingesta. Aromatics, such as ginger; stimulants, as hot water or whisky; or anodynes, as camphor or opium, by a diffusive action on the whole surface of the affected intestine, and upon its innervation, when they are absorbed and reach the ganglia, will renew a **proportionate** contraction (peristaltic) of the muscular coat, and remove the pain. Very often gentle friction, pressure or *kneading* the abdomen, or external warmth all over it, will have a similar balancive effect.

Laxatives for deficient movement of the bowels, astringents for excess of the same; cold to a too hot head, and mustard and hot water to cold feet, are all balancive means. So is the familiar and always safe use of a *mustard-plaster* to the skin, over any part of body which suffers pain. Pain denotes a morbid innervation from some cause. Apply something which, like mustard, causes a strong impression in a different place, not too remote, and the "error loci" of nerve-tension (or *debilitation*,[1] as the case may be), is done away with—the balance is restored.

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[1] *Radcliffe* "On Epilepsy, Pain, and Paralysis;" *Inman*, op. citat.