by Wallace. The action of the muscle was first correctly described by Helmholtz (1851). A controversy of long standing regarding the existence of a dilatator muscle of the iris appears to have been settled affirmatively by the researches of Kölliker, Retzius, and Juler. The structure of the lids, the lachrymal apparatus, and the retina was specially studied by H. Müller (Müller's muscle, Müller's fibres). The layer of rods and cones (Jacob's membrane) was discovered by A. Jacob, of Dublin, in 1819, the visual purple by Boll in 1876. Recently important comparative studies of the retina have been made by W. Krause and Ramón y Cajal.

The complicated anatomy of the ear has been the object of research by a great number of observers, only a few of whom can be mentioned here. The membrana tympani has been carefully investigated by O. Shrapnell (1832), Jos. Toynbee (1851), Rüdinger (1867), and Prussak (1868); the anatomy of the auditory ossicles and the mechanism of their movements has been elucidated by Helmholtz (1868); the Eustachian tube has been specially studied by Rüdinger, Huschke, and Kölliker; the membranous labyrinth by Böttcher, Henle, and Hyrtl. The organ of Corti was discovered by the Marchese di Corti in 1851. Additional details of its structure were established by E. Reissner (1854), M. Claudius (1856), O. Deiters (1860), and Hensen (1863). Special memoirs on the anatomy of the ear have been written by Rüdinger, Wharton Jones, Ayers, and Retzius.

As to the organ of smell, the olfactory cells were first described by Max Schultze in 1862, although they were probably seen previously by Ecker and Eckhardt. The tracing of the olfactory fibres has been effected by the labors of Kölliker, van Gehuchten, and Ramón y Cajal. The general anatomy of the passages of the nose has been carefully studied by Zuckerkandl.

The taste buds of the tongue were discovered by Schwalbe, of Strasburg, in 1867, and at about the same time by Lovén, of Christiania.

The tactile corpuscles of the skin were first seen by Meissner and Wagner in 1852, the end bulbs by W. Krause and Kölliker (1850–1858). Pacini discovered the corpuscles that bear his name in 1836, and they were described by Vater somewhat later (1841). Other nerve endings recently described are those of Golgi in tendons (1878), those of Ruffini in the fingers (1893), and the "muscle spindles" of Kühne and others found in the substance of muscle.

Most of our accurate knowledge of the minute anatomy of the viscera has been developed during the present century. Space does not permit a detailed account of the discoveries, but mention should be made of the work of Neumann, Lent, and Röse upon the teeth, and the attempts of Ryder, Osborn, Cope, and others to obtain from palæontological and other evidence a connected account of the mechanics of their development; of the work of Flemming, of Kiel, upon the principles of gland construction; and that of Heidenhain of Breslau upon the anatomy of the pancreas, the salivary and peptic glands. Investigations of the development of the peritoneum by Toldt, His, Treves, Brösike, and others have greatly aided our comprehension of that complicated structure. The liver has been specially investigated by Kiernan, Hering, Heidenhain, and Ranvier, and in the anatomy of the kidney great advances have been made. Henle described the loops of the uriniferous tubules that bear his name in 1862, Ludwig and Heidenhain have done much in elucidating the structure of the tubules, and Disse has studied the changes of the epithelia during secretion.

In the generative organs of the male researches in spermatogenesis have been carried on by La Valette St. George, Nussbaum, Flemming, Hermann, and Minot. In the female organs Pflüger and Waldeyer have investigated the structure of the ovary and the development of ovules, and Nagel has given the first exact description of the human ovum. The situation of the pelvic organs has been carefully determined by B. Schultze and Waldeyer, and an exhaustive examination of the human placenta has been made by Minot. *Frank Baker.*

ANCHYLODYNIA. See *Foot (Surgical)*.

ANCHYLOSIS. See *Ankylosis*.

ANCHYLOSTOMA DUODENALE. See *Nematodes*.

ANDERSON MINERAL SPRINGS.—Lake County, California.

Location.—Nineteen miles from Calistoga, five miles from Middletown, and ten miles from the Great Geysers.

Access.—By stage from Calistoga and Cloverdale.

The worshipper at nature's shrine, the lover of grand and varied scenery, will find all that can be desired at the Anderson Mineral Springs. The mountain stage ride is one of the most picturesque in the State. The ever-changing picture of hill and dale, of forest and shrubbery, and of brooks with ferns and mosses forms one of those pleasing panoramas which the spectator loves to recall in after days. The springs with the hotel and cottages are located in a cozy nook in a small cañon surrounded by forests abounding in picturesque waterfalls. The cool, leafy dells and the profound silence and solitude of the dense forests form an ideal combination to attract the early morning rambler. The atmosphere here is balmy and exhilarating and free from humidity. Fish and game abound all the year round. The accommodations offered to guests are excellent, and visitors come by the thousand to enjoy the numerous advantages of the spot. There are nine important springs. The principal drinking-spring, known as the Cold Sulphur, is located about one hundred and fifty yards from the hotel. It was analyzed by Dr. Winslow Anderson and found by him to have the following composition:

One United States Gallon Contains:

Solids.	Grains.
Sodium chloride	1.09
Sodium carbonate	9.27
Sodium sulphate	6.18
Potassium salts	Traces.
Magnesium carbonate	11.73
Magnesium sulphate	16.95
Calcium carbonate	20.40
Calcium sulphate	9.10
Ferrous carbonate	0.46
Arsenious salts	Traces.
Silica	2.45
Organic matter	Traces.
Total	77.63
	Cub. in.
Gases { Carbonic acid gas	243.50
Gases { Sulphureted hydrogen	4.20

This may be characterized as a saline sulpho-carbonated water. It has been found very beneficial in chronic skin diseases of strumous and syphilitic origin. In liver and bowel troubles, in uterine and ovarian engorgement, and in glandular congestions, the water has also proved to be of much value. It is aperient, diuretic, and alterative in its action.

The "Sour Spring" is one of the few California mineral springs containing free sulphuric acid. Its sour taste is supposed to be due to alum, but the following analysis by Mr. George E. Colby, of the California State University (1889), shows that no alum is present:

One United States Gallon Contains:

Solids.	Grains.
Sodium chloride	0.08
Sodium sulphate	0.49
Potassium sulphate	0.87
Magnesium sulphate	4.76
Calcium sulphate	2.07
Ferric sulphate	0.63
Aluminum sulphate*	7.11
Boric acid (with spectroscope)	Strong test.
Lithium (with spectroscope)	Well-marked test.
Ammonia (manganous sulphate)	0.33
Silica	3.94
Organic matter	Traces.
Total	20.28

* A microscopic examination of the residue obtained by slow evaporation fails to show characteristic crystals of alum.

A considerable quantity of free sulphuric acid was also revealed by the analysis. The temperature of the water is 64.3° F. It possesses tonic, astringent, and gently laxative properties, and has proved beneficial in hemorrhages from the lungs, menorrhagia, dyspepsia, etc.

Another valuable water is the "Iron Spring." The following is Mr. Colby's analysis, made in 1899:

One United States Gallon Contains:

Solids.	Grains.
Sodium chloride	0.18
Sodium bicarbonate	0.19
Sodium sulphate	3.42
Potassium sulphate	1.17
Magnesium sulphate	7.35
Calcium sulphate	10.88
Calcium phosphate	0.15
Ferrous carbonate	1.18
Alumina	0.93
Boric acid (with spectroscope)	Strong test.
Lithium (with spectroscope)	Well-marked test.
Manganous carbonate	1.77
Silica	4.22
Organic matter	Small quantity.
Total	31.44

Free carbonic acid gas, 25.80 cubic inches.
Temperature of water, 124° F.

This is a mild calcic-chalybeate water. It possesses tonic and slightly laxative properties, and is useful in anæmia and chlorosis and in conditions requiring restorative agents.

Among other valuable springs in this group may be mentioned the "Cosmopolitan," an excellent drinking water, possessing laxative properties; the "Belmar" Spring, a light saline-sulphur water; the "Magnesia Spring" (known also as "Father Joseph's Spring"), a rich saline water having valuable laxative properties; and the "Hot Sulphurous" or bathing spring. These last waters have a temperature of 145.5° F., and have been found very beneficial in rheumatism, chronic joint swellings, and skin diseases. It is claimed that the inhalation of the hot sulphurous steam of this water is highly useful in cases of chronic bronchitis, incipient phthisis, and catarrhal affections of the nose and throat. There are good facilities for bathing. The incrustations formed by the hot sulphurous vapors on the surrounding rocks are gathered and powdered and used in cases of chronic nasal catarrh, as well as for acute coryza and colds in the throat. This powder represents all of the solid mineral ingredients found in the water.

James K. Crook.

ANDROMEDOTOXIN. See *Ericaceæ*.

ANDROPOGON. See *Citronella Grass*.

ANELECTROTONUS. See *Electrotonus*.

ANENCEPHALUS. See *Teratology*.

ANESON.—Anesin; chloretone; acetone-chloroform. $(CH_3)_3COH.CCl_3$, tertiary trichlorbutylalcohol. Potassium hydroxide is slowly added to a mixture of equal weights of acetone and chloroform, and then steam is blown through. The resulting aneson forms a white crystalline mass resembling camphor and having a camphoraceous odor. It is slightly soluble in cold, more so in boiling water, is fairly soluble in strong alcohol, and freely in ether and chloroform. It is decomposed by strong sulphuric acid, but is not affected by weak acids or alkalies.

Aneson or chloretone is antiseptic, locally anæsthetic, and hypnotic. Combining the properties of an antiseptic and an anæsthetic, it promises to be of considerable value in minor surgery. Kossa and Vamossy found it to be slower in its action than cocaine, and somewhat less penetrating; yet it had more anæsthetic power, as a one-per-cent. solution was equivalent to a 2.8-per-cent. solution of cocaine. A lacerated wound or a burn soaked in a weak solution of aneson soon becomes anæsthetic, and permits of incision, suturing, etc., without pain. For other minor operations, especially about the mouth, nose, and eye, or for circumcision, it is superior to cocaine, and is used in such weak solution as not to have any systemic effect. It is non-irritant and does not dilate the pupil, and being a very stable compound its antiseptic power may be increased by the addition of mercuric bichloride, phenol, thymol, etc.

Houghton and also Albrich have found aneson to be readily absorbed from the stomach, and rapidly distributed throughout the body. It tends to slow the heart without weakening it, and it has no effect on the arteries or on the blood. In animals killed after large doses the greater amount of the drug is found in the brain. It is sedative and readily produces hypnosis, but has little or no effect on the important centres in the medulla oblongata. Aneson is not eliminated as such by the kidneys, the skin, or the lungs, and, as the chlorides in the urine are increased during its administration, it is probable that the drug is broken up in the system. Given by mouth, the mucous membrane of the alimentary canal becomes insensitive, nausea and seasickness are relieved, and in gastric cancer or ulcer, the pain and persistent vomiting are overcome. As a hypnotic, it does not irritate the stomach or the kidneys, and may be used with safety in cardiac and respiratory diseases. Five to twenty grains may be given in powder or capsule half an hour before bedtime, as its action is fairly rapid. Sixty grains have been given without disagreeable effect. As an anæsthetic it may be used in one-per-cent. solution, either directly applied to the surface or subcutaneously.

W. A. Bastedo.

ANEURISM.—An aneurism of an artery is a circumscribed tumor composed of a sac, the cavity of which communicates with the lumen of the artery, and contains liquid or coagulated blood. The sac may be formed in whole or in part of the distended wall of the artery, or of the condensed adjoining tissues.

Definitions and Classification.—The terminology of the affection has been much confused by a lack of agreement in the use of terms and in the meaning attached to them. Most of these terms are intended to indicate differences in the composition of the wall of the sac, some of which cannot even be recognized with certainty on direct examination, and are not marked by any corresponding clinical differences.

Internal and External.—*Internal* aneurisms are those situated within the thoracic or abdominal cavity; *external* aneurisms are those formed at the expense of arteries lying outside these cavities. (*Medical* is sometimes used as a synonym of internal; *surgical*, of external.)

Spontaneous and Traumatic.—*Spontaneous* aneurisms are those that have arisen in consequence of disease or gradual change in the wall of an artery. A *traumatic* aneurism is one which has formed in consequence of sudden mechanical division or injury of the wall of an artery, as by a knife or splinter of bone.

The following anatomical classification, adopted by Holmes, is the one in common use. The distinction made between "true" and "false" aneurisms is anatomically justified, but the terms are likely to mislead, for "true" aneurisms, in the narrow sense of the term—*i.e.*, aneurisms whose walls are everywhere composed of all the coats of the artery—are rare and always small. The common form of aneurism belongs to the class termed "false," those in which only one of the coats of the artery takes part in the formation of the wall of the sac.

I. Common or encysted aneurism, subdivided into—

(*a*) Aneurismal dilatation, or fusiform aneurism. The artery is dilated for some distance, and the wall of the dilated portion preserves its three coats.

(*b*) True aneurism. The sac is formed throughout by all the coats of the artery dilated at only one point.

(*c*) False aneurism. The sac is formed by only one or two of the coats of the artery, the middle one having disappeared or being unrecognizable in consequence of change.