caruncula Morgagni (middle lobe of prostate), frenum Morgagni (near ileo-cæcal valve), fossa Morgagni (navicular fossa of urethra), hydatids of Morgagni (on fimbriæ of Fallopian tube), columns of Morgagni (in the rectum), etc., etc.

Closely allied to pathological anatomy is surgical anatomy, which made many important advances. John Hunter (1728–1793), an indefatigable investigator, is said to have dissected some thousands of bodies. It is to him that we owe a demonstration of the ease with which collateral circulation is established after ligation of vessels, and the reparative significance of inflammation. He also appears to have been aware of the law of recapitulation in embryology, by which the fœtus of an animal successively passes through forms resembling creatures below it in the animal scale. During thirty years he worked at collecting a museum illustrative of comparative and human anatomy and pathology, which finally comprised some fourteen thousand specimens. It is still considered one of the best extant. It is from him that is named the canal traversed by the femoral artery under the adductor magnus.

Other workers in surgical anatomy were Antonio Scarpa (1752–1832), professor at Modena (Scarpa's triangle, fascia, nerve, ganglion, etc.); Franz Caspar Hesselbach (1759–1816), professor at Würzburg (Hesselbach's triangle); Antonio de Gimbernat (1762–1774), professor at Barcelona (Gimbernat's ligament).

Certain beginnings were now made in the study of the comparative anatomy of the races of man. Pieter Camper (1722–1789), professor at Amsterdam, Franeker, and Gröningen, was a widely learned man; at once an anatomist, a zoologist, a geologist, and an artist, he published in almost every branch of natural history essays remarkable for their originality and research. He was the first to show that the hollow bones of birds are connected with their respiratory apparatus, and wrote an important memoir on the anatomy of the orang, showing that that animal could not be considered as degenerated from man, as had been supposed by some. Noticing that painters took no pains to depict the special physiognomy of the races of mankind, he began to study racial types and invented the celebrated "facial angle," formed by a plane tangent to the most prominent points of the forehead and face and another drawn through the auditory openings and the alæ of the nose. He found that this angle gradually decreases as we descend through the animal kingdom, and concluded that the different races of mankind might be distinguished by it. A wider examination has shown that this view is incorrect, but the method instituted by him of measuring portions of the skull by means of angles has been extensively used in other directions.

Another famous angular measurement was that of the occipital angle of L. J. M. Daubenton (1716–1799), the curator and almost the creator of the splendid museum of the Jardin des Plantes. This was intended to measure the inclination of the foramen magnum, which also varies very much in the animal scale, and has relation to the erect position of the body.

The comparison of crania was systematically pursued by Johann Friedrich Blumenbach (1752–1840), professor at Göttingen, who prescribed for the examination of skulls certain positions that are still in use. He possessed a very large collection of crania, and made important generalizations regarding the races of men. While considering these as very numerous, he grouped them in five principal divisions, to which he applied designations that held for more than a century. Three of these he considered primary: the Caucasian, Mongolian, and Ethiopian; two secondary or intermediate: the American and Malayan.

Logically connected with this, although not developed until early in the nineteenth century, was the curious doctrine widely known as "phrenology," though its founder, Franz Joseph Gall, of Baden (1758–1828), called it "organology." Gall was by no means ignorant of the gross anatomy of the brain, but he knew nothing of its histology and supposed the white substance to be equally active with the gray in intellectual processes. Noticing the convergent fibres of the corona radiata, he conceived the idea that the brain was a series of pyramidal "organs" whose bases were superficial and whose apices were deeply buried in the medulla oblongata. These organs correspond to supposed functions of the mind, concerning which he appears not to have had any well-digested philosophical ideas. He believed that he had demonstrated that the organs varied in size and external prominence in different individuals to such an extent that character and mental aptitudes could be told by palpation of the protuberances of the cranium, due allowance being made for the natural bony prominences common to all skulls. Gall described twenty-seven organs, his pupil Spurzheim added ten more, and his followers in this country increased these by six, making a total of forty-three. When the nerve cells were discovered and it was seen that the gray matter was the effective working element of the brain, and that the surface projecting externally was only a small portion of the cortical area, phrenology had no longer a satisfactory reason for existence as a doctrine. However, it retained a considerable vogue for a time, being especially diffused by peripatetic lecturers whose influence in spreading among the people a knowledge of the physical basis of mind was often considerable.

A correct appreciation of some parts of the body was now greatly aided by the advancement of chemistry. Oxygen was discovered by Priestley in 1774. Its true significance was not, however, understood until the demonstrations of Lavoisier (1743–1794), who showed its importance in combustion and respiration. Antoine François de Fourcroy (1755–1809) was the first to investigate the composition of organic products, and William C. Cruikshank (1745–1800) discovered urea.

The delimitation of the organs of the body in the living, which may be said to be an anatomical art, was now much advanced by the invention of percussion by Joseph Leopold Auenbrugger (1722–1809), a physician of Vienna.

The advances made in the knowledge of the grosser structures were rather refinements upon what was already roughly sketched out than incursions into new fields. Josias Weitbrecht (1702–1747) was the author of a celebrated treatise upon syndesmology that contains the elements of our knowledge of ligaments to-day. Exupère Joseph Bertin (1712–1781), an academician of Paris, described the ilio-femoral ligament, the sphenoidal turbinated bones, and the septa of the kidney. Bernhard Siegfried Albinus (Weiss, 1697–1770), professor at Leyden, greatly improved myology by the publication of magnificent colored plates showing the muscular system most carefully delineated. He was also the first to demonstrate by injections the connection between the vascular systems of the mother and the fœtus.

In the vascular system considerable advances were made. Gilbert Breschet (1784–1845) described the veins and canals of the diploë; William Hunter (1718–1783), brother of John and lecturer at Middlesex Hospital, demonstrated the arrangement of the lymphatics and showed them to be absorbents. He was also the author of a paper on the anatomy of the gravid uterus which is the basis of all subsequent descriptions. It particularly notes the changes in the cavity and the formation of the decidua. He carefully described the descent of the testes, and his name is often coupled with the round ligament of the uterus and the gubernaculum testis. William Hewson (1739–1774) also contributed to knowledge of the lacteals and lymphatics, tracing them in birds, fishes, and reptiles. Paolo Mascagni (1752–1815) professor at Siena, Pisa, and Florence, published elaborate studies of the lymphatics which were afterward continued by Vincenz Frohmann (1794–1837), professor at Heidelberg and Louvain.

In the realm of the nervous system considerable advances were made. Giovanni Maria Lancisi (1654–1720), the teacher of Morgagni and physician to the Pope, described more carefully than had been done before some features of the brain (nerves of Lancisi). Alexander

Monro I. (1697–1767), one of Boerhaave's favorite pupils, professor at Edinburgh, gave an excellent description of the bones and nerves; but his fame was eclipsed by that of his son, Alexander Monro II. (1733–1817), also professor at Edinburgh, who was especially noted for his work in the anatomy of the brain (foramen of Monro, sulcus of Monro). He was the first to attempt a description of all the bursæ mucosæ of the body. Félix Vicq d'Azyr (1748–1794), an academician of Paris, demonstrator at the Jardin du Roi, and excellently versed in comparative and veterinary anatomy, also studied the brain and added to our knowledge of the minute structure of the white and gray matter (line and bundle of Vicq d'Azyr). Johann Christian Reil (1759–1813) first described the insula or island of Reil. Luigi Rolando (1773–1831), professor at Turin, distinguished himself by careful researches in both the brain and spinal cord (fissure, gelatinous substance, and tubercle of Rolando).

The cranial nerves received renewed attention. It was Johann Jacob Huber (1707–1778), professor at Göttingen and Cassel, who clearly pointed out the error of Willis in placing the suboccipital nerve among the cranial nerves, though Haller also commented upon this. Carl Samuel Andersch (1732–1777) distinguished from each other for the first time the ninth, tenth, and eleventh nerves, and discovered the petrous ganglion. Samuel Thomas Sömmering (1755–1830) was the first to separate the facial and the auditory nerves, thus establishing the twelve cranial nerves as we now enumerate them. This enumeration, usually ascribed to Sömmering, was really first definitely proposed, in 1794, by Johann Christoph Mayer (1747–1801). The little intermediary nerve that makes the tale of the cranial nerves absolutely complete was first described by Heinrich August Wrisberg (1739–1808), professor in Göttingen, who also made other discoveries, his name remaining in the lesser cutaneous nerve of the arm, in one of the cartilages of the larynx, and in a small ganglion in the substance of the heart.

Johann Friedrich Meckel, the first in a succession of famous anatomists of the name (1714–1774), professor at Berlin, gave especial attention to the trigeminus and facial nerves and was the first to describe the spheno-palatine ganglion and the space in the dura mater that contains the ganglion of the trigeminus. The latter structure appears to have been first recognized as a ganglion by J. Lorenz Gasser, of Vienna, about 1750. Meckel had previously described it as a tænia nervosa, and Vieussens as a plexus ganglioniformis, and Eustachius had figured it in his celebrated plates. It was named by Hirsch as the ganglion Gasserianum, in honor of his illustrious master.

The tympanic nerve and the jugular ganglion of the glosso-pharyngeal nerve were first described by Johann Ehrenritter (about 1775), professor at Vienna, although from the exact researches of L. L. Jacobson (1783–1843), professor at Copenhagen, the nerve usually bears his name. To the latter author is also ascribed the discovery of Jacobson's organ in the nasal fossæ of the sheep and of its vestiges in man.

A physiological discovery of much importance in the elucidation of the anatomy of the nervous system was that of the distinction between the motor and the sensory roots of the spinal nerves made by Georg Prochaska (1749–1820), professor at Prague. This was afterward clearly established by the Edinburgh anatomist, Sir Charles Bell (1774–1842), who also showed conclusively the motor function of the facial nerve. The posterior thoracic nerve is often called the external respiratory nerve of Bell.

In the anatomy of the viscera there should be mentioned the investigations of Lorenz Heister (1683–1758), professor at Altorf and Helmstadt, who discovered the spiral valve in the neck of the gall bladder; Antoine Ferrein (1693–1769), professor at Paris, who investigated the kidney and the organs of voice; Joseph Lieutaud (1703–1780), who described anew the bladder, mentioning for the first time the trigone. He was famous in pathological anatomy, publishing a work based on the examination of twelve hundred bodies. Johann Nathanael Lieberkühn (1711–1765) was famous for injected preparations and made some excellent observations on the minute anatomy of the intestinal mucous membrane, including the villi and glands. Johann Christian Rosenmüller (1771–1820), professor at Leipsic, investigated the nasal fossæ and the annexes of the uterus. The anatomy of the vocal organs was also investigated by Denis Dodart (1634–1707), who held that the voice was caused by a vibration of the air in the larynx, while Ferrein held that it was due to a vibration of the vocal chords. Giovanni Domenico Santorini (1681–1737) also paid especial attention to the organs of voice, to the emissary veins of the cranium, and to the muscles of the face (corpuscula Santorini of the larynx, emissaria Santorini, cartilage of Santorini in the nose, musculus risorius Santorini of the face).

The anatomy of the eye was especially enriched by important discoveries during this period. François Pourfour du Petit (1664–1741) paid especial attention to the lens and described the lacunar spaces in the suspensory ligament, often called the canal of Petit. Jacob Hovius, a Dutch anatomist (about 1702), appears to have discovered the chorio-capillary layer of the chorioid, afterward accredited to Ruysch (tunica Ruyschiana). He also described the venæ vorticosæ. Eberhard Jacob von Wachendorff discovered the pupillary membrane in 1740, though it is possible that it may have been previously known to Albinus. Jacques René Tenon (1724–1816), an academician at Paris, described the fascial attachments of the eyeball more accurately than had been heretofore done (capsule of Tenon, space of Tenon). In some cases controversies arose as to priority of discovery: the separable posterior layer of the cornea, which was apparently seen and described by Benedict Duddell, an oculist of London in 1729, was rediscovered by Jean Descemet, professor at Paris (1732–1810), and at about the same time by Pierre Demours (1702–1795), demonstrator at the Jardin du Roi. The most important treatise on the anatomy of the eye that appeared during the last century, and the basis of all that has since been published, is that of Johann Gottfried Zinn (1727–1759), professor at Göttingen (zonule of Zinn, ligament of Zinn). Felice Fontana (1730–1805), professor at Pisa, described the attachment of the iris and the trabecular tissue since known as the spaces of Fontana. Johann Gottfried Berger (1659–1736) was probably the first to indicate the existence of the orbicular muscular fibres of the iris.

The profound and exact researches in the anatomy of the internal ear made by Domenico Cotugno (Cotunnius, 1736–1822), professor at Naples, were probably the most significant of any made in this region during the century. He also investigated the pathological anatomy of the skin, and was the first to demonstrate by boiling the existence of albumin in urine. His name remains in the liquor of Cotunnius or perilymph, the aqueduct of Cotunnius (aqueductus vestibuli), and the nerve of Cotunnius (naso-palatine nerve).

The great advance in the anatomical sciences during the nineteenth century has been primarily due to what may be termed their secularization, that is to say, to the extension of research by placing it in the hands of all students inclined to pursue it. At the beginning of the century the old method of teaching by means of demonstration was still almost everywhere pursued. Students were rarely able to dissect, and the procuring of bodies for anatomical purposes was beset with difficulties. In 1827 the University of Edinburgh, with nine hundred students, made dissection compulsory, and this excellent example was immediately followed by London, Liverpool, and Dublin.

In consequence of this the demand for human cadavers was greatly increased and the price so enhanced that unscrupulous persons were tempted to procure them by surreptitious means. Grave-robbing, hitherto exceptional, now became common, and in every large city where medical schools flourished there became established a set of ruffians who made it their business to supply dissecting tables with bodies ruthlessly torn from the graves to which they had been consigned by sorrowing friends. The large iron cages built over many graves and the formidable enclosures of cemeteries of this period in England and Scotland testify to a widespread fear, and a glance at the literature of the early part of this century will show what an effect this ghastly practice had upon the popular mind. It would be easy to give many authentic examples which were not confined to common law-breakers, for, led by a youthful love for adventure or perhaps in some cases by a real zeal for knowledge, bands of students and even of professional men broke into cemeteries and violated graves. The law required of medical practitioners a competent knowledge of anatomy, and yet denied them the means necessary for attaining it.

The absurdity of such a position was not realized until the shocking disclosures of the trial of Burke and Hare at Edinburgh in December, 1828. It was shown that these scoundrels had murdered at least sixteen persons for the purpose of selling their bodies. Similar cases were those of Bishop and Williams, executed in London in 1831. Bishop had followed his nefarious trade for twelve years, and had sold to the colleges at least five hundred bodies, some of which were doubtless those of murdered victims. The excitement occasioned by these trials led to a parliamentary inquiry and the passage of the Warburton anatomy act, August 1, 1832, which legalized dissection under certain restrictions and provided for turning over to the medical schools the bodies of unclaimed paupers. Upon the continent of Europe similar regulations had already been for some time established.

The cooperation of a large number of additional workers led to greater precision in all anatomical work, to the accumulation of a vast body of additional facts, and finally to a more comprehensive and satisfactory generalization of the principles that underlie and affect anatomical structure. The idea of the filiation and progressive development of all organic beings—considered a wild and unsubstantial hypothesis during the eighteenth century—has constantly gained in weight and force by increasing knowledge of existing forms—comparative anatomy; of extinct forms—palæontology; and of individual development—embryology. This increase in knowledge has been greatly aided by improvement in the microscope, which has become an efficient and reliable instrument of research, and by the application of chemical and mechanical methods to the preparation of tissues for microscopical examination, which methods are grouped together under the term of microscopical technology.

Fragments from the writings of some of the ancient philosophers, notably Empedocles and Democritus, show that ideas of adaptation and mutability of forms had occurred to them. So, too, we find traces of such speculations in the writers of the last century: Buffon, Erasmus Darwin, and Goethe. These ideas were developed into a coherent system by Jean Lamarck (1744–1829), professor of natural history at the Jardin des Plantes and one of the most acute minds of his age. His force as a naturalist will be appreciated when we recall that we owe to him the division of animals into vertebrates and invertebrates, and also the separation of the groups crustacea, arachnida, and annelida. He invented the term biology for the sciences of life, though Treviranus suggested it during the same year (1802). In his "Philosophie zoologique" is first scientifically stated and systematically supported the mutability of species and their origin by adaptation. Lamarck thought that such changes were caused mainly by the needs of the animal and the use and disuse of organs, becoming cumulative in the race by the transmission of acquired characters. For these changes three factors—space, time, and matter—are requisite; and these are produced by nature in unlimited quantities, hence the multiplicity of organic forms. He was the first to conceive the ancestral record of man as a branching tree instead of a series of ascending steps. The formation of the lowest animals from mucilaginous matter was suggested by him, prior to Oken's sea-slime theory.

The views of Lamarck, although widely accepted in a modified form by the naturalists of to-day, were very coldly received at that time. This was largely due to the powerful opposition of Georges Cuvier (1769–1832), professor at the Musée d'Histoire Naturelle at Paris, and the foremost naturalist of his time. He greatly advanced knowledge of both living and extinct forms of animal life and has been called the founder of comparative anatomy and of palæontology. From a modern point of view his work is most contradictory. While he founded a true natural system in zoology, showing that the forms of the animal world may be reduced to a few distinct types, he yet upheld the absolute fixity of species. While investigating fossil remains with an ardor and success never before equalled, he advanced the theory that all organic living forms had been repeatedly wiped out of existence by unexplained cosmic catastrophes. In opposition to the epigenetic views of Wolff and others, he also upheld the evolution of the embryo from a preformed miniature. Throwing the weight of his great influence against the development theory, he was able, owing to the lack of data, to discredit it almost wholly, and to control the trend of biological thought until after the middle of the century.

A growing revolt against this domination was, however, caused by the advances of knowledge. Gottfried Treviranus of Bremen (1776–1837) was among those who protested against making the biological sciences a mere catalogue of names, as was done by Linne and Cuvier, holding that it is possible to discover a philosophy of nature. He suggested the theory of compensatory development, deficiency in one part being made up by excess in another, and recognized that the environment reacts upon the individual. The wider and more complex the environment the higher must be the grade of the organism.

Étienne Geoffroy St. Hilaire (1772–1844), professor of zoology at the Jardin des Plantes, and the author of remarkable treatises on teratology and philosophical anatomy, was also an opponent of Cuvier's views. He held that the principal factor in the transformation of species is changing environment, acting particularly through its effect upon respiration. His teratological studies led him to conclude that the course of development of organic forms is not necessarily gradual, but that sudden and considerable changes may occur, thus opposing the Leibnitzian doctrine in favor of so-called "saltatory" evolution.

A collateral influence in favor of uniformity of action was afforded by Sir Charles Lyell (1797–1875), who by a cogent marshalling of ascertained facts finally overthrew (1830) the Cuvierian doctrine of catastrophes in geology. He also published in 1863 an important treatise on the "Antiquity of Man," in which he showed that human remains are found in the strata of quarternary or perhaps earlier times, and that they in general indicate a lower organization than that of modern Europeans.

Advances in knowledge of embryological development continued and afforded support to the new hypotheses. Johann Friedrich Meckel (1781–1833), professor in Halle, grandson of the previous anatomist of the same name, called to notice the forgotten writings of Wolff, and himself made important observations. To him is due the discovery of Meckel's cartilage in the lower jaw, and of Meckel's diverticulum, the vestigial stem of the omphalomesenteric duct. He seems to have been the first clearly to formulate what is now known as the law of recapitulation, stating that the original form of all organisms is the same, and that in process of development the higher assume as transitory stages the permanent forms of the lower. This was even more definitely stated by Serres (1842) in his "Précis d'anatomie transcendente," who declared comparative anatomy to be an arrested embryology, and embryology a transitory comparative anatomy. Haeckel calls this the "fundamental biogenetic law," and states it thus: "Ontogeny is a short and quick repetition or recapitulation of phylogeny, determined by the laws of inheritance and adaptation."

Under the influence of Ignatz Döllinger, of Würzburg, who was an ardent embryologist, and who revived the use of the microscope, arose Christ. Pander (1793–1865), who studied the development of the chick and confirmed Wolff's theory of the germinal layers, and Carl Ernest von Baer (1792–1876), professor in Dorpat, St. Petersburg, and Königsberg, who discovered the mammalian ovum and the chorda dorsalis. He pointed out that the development of the individual is an advance from a generalized to a more specialized form, and brought the theory of the blastodermic layers to nearly its present condition.

The correction of chromatic and spherical aberration in the microscope was finally practically effected about 1824, and the instrument was soon used in research with more certain results than had hitherto been possible. This led to a reinvestigation of the tissues of the body and the formulation of the important doctrine known as the *cell theory*. That organic forms had for their basis minute elementary units had been suspected by many observers, especially in the domain of vegetal anatomy, the cellular structure of plants being more apparent than that of animals. The speculations of the Greek philosophers in this field were wholly metaphysical, and it was not until after the invention of the microscope (1665) that Robert Hooke first saw and figured the structure of cork as a series of minute honeycomb-like cavities, to which he applied the name of *cells*. In 1671, Grew and Malpighi separately presented to the Royal Society of London papers advancing the view that plants are composed of vesicles with fluid contents and rigid walls, and of vessels or tubes. Wolff (1759) supposed the primitive elements of plants to be gelatinous globules or droplets, Moldenhawer (1812) showed that each plant cell has its own distinct wall, Turpin (1826) held that each has an individuality of its own, Leeuwenhoek, Fontana, and others appear to have seen the cell nucleus, while Robert Brown (1831) was the first to recognize it as a constant normal constituent. Schleiden (1838) considered the nucleus to be the generator of the cell, calling it the cytoblast, and also showed that all parts of plants are composed of cells or their derivatives. Dutrochet, as early as 1824, advanced the idea that animals and plants are composed of cells, but it was reserved for Theodor Schwann (1810–1882), professor at Louvain, to demonstrate this in a satisfactory manner in 1838–39. At this time a cell was supposed to be a hollow vesicle having a wall and a cavity containing fluid.

The constitution of the cell now received attention. The name *sarcode* was applied by Dujardin (1835) to the gelatinous matter composing the body of rhizopods, while a similar substance in plants was called by Mirbel *cambium*, by Schleiden *mucilage*, and finally by Hugo von Mohl *protoplasm*, a term previously used by Purkinje for the formative tissue of young embryos. The practical identity of these substances was shown by Max Schultze and De Bary, and the name protoplasm was henceforth used for the active living matter of both plant and animal cells.

Further observation of young cells now showed not only that they had no permanent cavity, but that the cell wall, supposed by earlier observers to be essential, was often absent. Reduced to its simplest expression the definition of a cell was then formulated by Leydig (1856) as "a mass of protoplasm provided with a nucleus."

Schwann and the earlier observers believed that cells originate in a structureless blastema as crystals form in a mother liquor. Cellular division was first observed by Mohl in algæ (1835), in other plants and in animals by Nägeli, Kölliker, Bischoff, and others, and finally, in 1855, Virchow was able to formulate his famous maxim, "*Omnis cellula e cellula*," which had been, however, anticipated by Goodsir, who declared in 1845, "No cells without pre-existing cells."

The phenomena of embryology were now brought under the category of cell division. The ovum was recognized as a cell by the immediate followers of Schwann, with the "germinal vesicle" of Purkinje (1825) as its nucleus. The segmentation of the ovum, first definitely described (in frog's eggs) by Prevost and Dumas (1824), was now seen to be a case of cell division. Ova were already known to develop from the body of the mother—a similar development was shown for the spermatozoa by Kölliker (1841). The structure of the body was thus shown to depend upon cells derived from the parents.

The resemblance of infusoria to cells was first noted by Meyer in 1839, and in 1845 Siebold classed them as unicellular beings, naming them protozoa.

The cell theory as formulated by Schwann and his immediate successors may then be formulated as follows:

1. All organized beings, including man, are composed of minute microscopical units that have independent life and multiply by division.

2. The primitive form of each individual, as well as the permanent form of the lowest creatures, is a single cell.

The influence of this doctrine upon all departments of anatomy was very great. The human body was wholly re-examined to ascertain the arrangement and relations of its elements. Thus the department of histology became elevated to a high rank, affording scope for thousands of investigators. In pathological anatomy also great advances were made, and the investigation of disease was placed upon a sound scientific basis. In this field Rudolph Virchow, by the publication of his classical treatise "Cellular Pathology," performed most valuable service.

Hand-in-hand with the investigation of the anatomical constitution and the relations of cells proceeded the development of technical methods and the discovery of the behavior of cells toward various reagents. These have greatly aided microscopical research, and account in a very large measure for the immense progress in this field as compared with any previous period of equal extent. In 1842 Stilling invented the cutting of thin serial sections which can be examined by transmitted light. By this means it became possible to reconstruct the interior fabric of the most delicate organs. By the improved instruments of recent times there can now be cut sections as thin as from $5\,\mu$ to $1\,\mu$ ($\frac{1}{5000}$ to $\frac{1}{25000}$ of an inch). The clearing and mounting of sections was invented by Lockhart Clarke in 1851, hardening by dehydration with absolute alcohol by H. Müller in 1856. These at once greatly facilitated manipulation and a wider study of microscopical preparations. The immediate result was the discovery, by Remak and Deiters, of the processes of nerve cells. Carmine staining was invented by Gerlach in 1858, and led to knowledge of nuclear structure and the discovery of nuclei where none had been hitherto suspected. Silver staining in solution appears to have been first invented by von Recklinghausen in 1860, although staining by the solid stick had been previously used by His and others; it led to a clearer knowledge of cell boundaries and contents. The staining by aniline dyes and the method of double staining were first applied by Waldeyer in 1863, and led to important advances in knowledge of cell structure and cell division. Max Schultze, in 1865, first devised staining by perosmic acid, which resulted in clear conceptions of the medullary sheath of nerve fibres. Other means of differentiating nervous tissue were found in the gold stain of Cohnheim (1866), the palladium stain of F. E. Schultze (1867), and the remarkable bichromate of silver stain of Golgi (1873). These have made it possible to trace the processes of nerve cells to their finest ramifications and have given to neurology the remarkable precision possessed by it to-day, a precision never dreamed of by the anatomists of the last century. Embedding in celloidin was invented by Schiefferdecker in 1882, the hæmatoxylin mordant method which has given such excellent results in tracing nerve tracts, by Weigert (1884) and Pal (1887). The methylene blue method of Ehrlich, to which are due some of the most important of the recent discoveries, was invented in 1886. Finally should be mentioned the improvements in the instrument itself by