Faye (1701-1781), Ledran, Antoine Louis (1723-1792), Sauveur Morand (1697-1773) and Pierre Percy (1754-1825) of Paris, Bertrandi of Turin, Troja of Naples, Palleta of Milan, Schmucker of the Prussian army, August Richter of Göttingen, Siebold of Würzburg, Olaf Acrel of Stockholm and Callisen of Copen­hagen.

Two things gave surgical knowledge and skill in the 19th century a character of scientific or positive cumula­tiveness and a wide diffusion through all ranks of the profession.@@1 The one was the founding of museums of anatomy and surgical pathology by the Hunters, Guillaume Dupuytren (1777-1835), Jules Cloquet (1790-1843), J. F. Blumenbach (1752-1840), John Barclay ( 1758- 1826), and a great number of more modern anatomists and surgeons; the other was the method of clinical teaching, exemplified in its highest form of constant reference to principles by Thomas Lawrence (1711-1783) and James Syme (1799-1870). In surgical procedure the discovery of the anaesthetic properties of ether, chloroform, methylene, &c., was of incalculable service; while the conservative principle in operations upon diseased or injured parts, and especially what may be called the hygienic idea (or, more narrowly, the antiseptic and aseptic principles) in the conditions governing surgery, were strikingly beneficial.

The following were among the more important additions to the resources of the surgical art: the thin thread ligature for arteries, introduced by Jones of Jersey (1805) ; the revival of torsion of arteries by Jean Amussat (1796-1856). [1829] ; the practice of drainage by Pierre Marie Chassaignac (1805-1872) [1859]; aspiration by Philippe Pelletan (1747-1829) and recent improvers; the plaster-of-Paris bandage or other immovable application for simple fractures, club­foot, &c. (an old Eastern practice recommended in Europe about 1814 by the English consul at Basra); the re-breaking of badly set fractures; galvano-caustics and écraseurs; the general introduction of resection of joints (Sir William Fergusson (1808-1877), Syme and others); tenotomy by Jacques Delpech (1777-1832) and Louis Stromeyer (1804-1876) [1831]; operation for squint by Johann Dieffenbach (1795-1847) [1842]; successful ligature of the external iliac for aneurism of the femoral by John Abernethy (1764-1831) [1806]; ligature of the subclavian in the third portion by Astïey Cooper (1768-1841) [1806], and in its first portion by Colles ; crushing of stone in the bladder by Gruithuisen of Munich (1819) and Jean Civiale (1792-1867) of Paris [1826] ; cure of ovarian dropsy by remov­ing the cyst (since greatly perfected) ; discovery of the ophthalmo­scope, and many improvements in ophthalmic surgery by Alfred von Gräfe (1830-1899) and others; application of the laryngoscope in operations on the larynx by Jean Czermak (1828-1873) [i860] and others ; together with additions to the resources of aural surgery and dentistry. The great names in the surgery of the first half of the century besides those mentioned are: Antonio Scarpa of Italy (1747-1832); Alexis Boyer (1757-1833), Félix Larrey (1766-1842)— to whom Napoleon left a legacy of a hundred thousand francs, with the eulogy: “ C’est l'homme le plus vertueux que j’aie connu,” Philibert Roux (1780-1854), Jacques Lisfranc (1790-1847), Alfred Louis Velpeau (1795-1868), Joseph Malgaigne (1806-1865), Auguste Nélaton (1807-1873)—all of the French school; of the British school, John Bell (1763-1820), Charles Bell (1774-1842), Allan Burns (1781-1813), Robert Liston (1794-1847), James Wardrop (1782- 1869), Astley Cooper, Henry Cline (1750-1827), Benjamin Travers (1783-1858), Benjamin Brodie (1783-1862), Edward Stanley (1793- 1862) and George Guthrie (1785-1856) ; in the United States, V. Mott, S. D. Gross and others; in Germany, Kern and Schuh of Vienna, Von Walther and Textor of Würzburg, Chelius, Hesselbach and the two Langenbecks—Konrad (1776-1851) and Bernhard (1810-1887).

Authorities.—Wise, *History of Medicine among the Asiatics* (2 vols., London, 1868); *Paulus Aegineta,* translated with commentary on the knowledge of the Greeks, Romans and Arabians in medicine and surgery, by Francis Adams (3 vols., London, 1844-1847), Häser, *Gesch. d. Medicin* (3rd ed., 1875-1881), vols. i. and ii. (C. C.)

*Modern Practice of Surgery.@@2—*A great change has taken place in the practice of surgery since the middle of the 19th century, in consequence of the new science of bacteriology, and the introduc­tion of aseptic methods, due to the teaching of Lord Lister.

It had long been known that subcutaneous injuries followed a far more satisfactory course than those with wounds, and the history of surgery gives evidence that surgeons endeavoured, by the use of various dressings, empirically to prevent the evils which were matters of common observation during the healing

of open wounds. Various means were also adopted to prevent the entrance of air, as, for instance, in the opening of abscesses by the “ valvular method ” of Abernethy, and by the subcutaneous division of tendons in “ club-foot.” Balsams and turpentine and various forms of spirit were the basis of many varieties of dressing. These different dressings were frequently cumber­some and difficult of application, and they did not attain the object aimed at, while, at the same time, they shut in the dis­charges and gave rise to other evils which prevented rapid and painless healing. In the beginning of the 19th century these complicated dressings began to lose favour, and operating surgeons went to the opposite extreme and applied a simple dressing, the main object of which was to allow a free escape of discharge. Others applied no dressing at all, laying the stump of a limb after amputation on a piece of dry lint, avoiding thereby any unnecessary movement of the parts. Others, again, left the wound open for some hours after an operation, preventing in this way any accumulation, and brought its edges and sur­faces together after all oozing of blood had ceased, and after the effusion, the result of injury to the tissues in the operation had to a great extent subsided. As a result of these measures many wounds healed kindly. But in other cases inflammation occurred, accompanied by pain and swelling, and the formation of pus. High fever also, due to the unhealthy state of the wound, was observed. These conditions often proved fatal, and surgeons attributed them to the constitution of the patient, or else thought that some poison had entered the wound, and, passing from it into the veins, had contaminated the blood and poisoned the patient. The close association between the forma­tion of pus in wounds and the fatal “ intoxication " of many of those cases encouraged the belief that the pus cells from the wound entered the circulation. Hence came the word “ pyaemia.” It was also observed that a septic condition of the wound was usually associated with constitutional fever, and it was supposed that the septic matter passed into the blood—whence the term “ septicaemia.” It was further observed that the crowding together of patients with open wounds increased the liability to these constitutional disasters, so every endeavour was made to separate the patients and to improve ventilation. In building hospitals the pavilion and other systems, with windows on both sides, with cross-ventilation in the wards, were adopted in order to give the utmost amount of fresh air. Hospital buildings were spread over as large an area as possible, and were restricted in height, if practicable, to two storeys. The term “ hospitalism ” was coined by Sir J. Y. Simpson, who collected statistics comparing hospital and private practice, by which he endeavoured to show that private patients were far less liable to such catastrophes than were those who were treated in hospitals.

This was the condition of affairs when Lister in i860, from a study of the experimental researches of Pasteur into the causes of putrefaction, stated that the evils observed in open wounds were due to the admission into them of organisms which exist in the air, in water, on instruments, on sponges, and on the hands of the surgeon or the skin of the patient. Having accepted the germ theory of putrefaction, Lister applied himself to discover the best way of preventing all harmful organisms from reaching the wound from the moment that it was made until it was healed. In the germ he had to deal with a microscopic plant, and he desired to render its growth impossible. This, he thought, could be done either by destroying the plant itself before it had the chance of entering the wound or after it had entered, or by facilitating the removal of the discharges and preventing their accumulation in the wound, and by doing everything to prevent the lowering of the vitality of the wounded tissues, because unhealthy tissues are the most liable to attack. Several sub­stances were then known as possessing properties antagonistic to sepsis or putrefaction, and hence called “ antiseptic.” Acting on a suggestion of Lemaire, Lister chose for his experiments carbolic acid, which he used at first in a crude form. He had many difficulties to contend with—the impurity of the substance.

@@@1 the Royal College of Surgeons in 'London was established in 1800, the title being changed in 1843 to Royal College of Surgeons of England.

@@@3 For the surgery of any particular region or organ, reference should be made to the article on that region or organ.