

Classic Scenes of Science

History of Science

Prepared by Helen Miles Davis.

The historical associations which saturate famous European towns hold for many travelers as much meaning as the "sights" of the present day so carefully listed in the guide-books. For those who have enjoyed the "Classics of Science," we have prepared this itinerary which takes in places made famous by the work of earlier leaders of scientific thought. The historically-minded will enjoy hunting out relics or mementoes of their favorite heroes.

ENGLAND—While in *London* biologists and physicians will find it interesting to know that the Royal College of Physicians, chartered and separated from the barbers by Henry VIII in 1518, had among its famous Fellows William Gilbert (1544-1603), author of "De Magnete," and William Harvey (1578-1657), discoverer of the circulation of the blood. *Kennington*, which will attract all scientific visitors by its museums, was the site of one of Faraday's experiments on the magnetism of the

earth, and was the home of Newton at the time of his death. *Teddington*, a short distance south of London, not only contains the National Physical Laboratory, but was the home of Stephen Hales, who discovered transpiration of plants and blood pressure of animals. *Colchester*, just north of London, was the home of William Gilbert, the student of magnetism. *Cambridge University* enshrines the memory of many of the greatest British scientists. William Gilbert matriculated there in 1558. William Harvey took his B.A. there in 1597. It was the home of Isaac Newton during a great part of his life. Among objects of interest to scientists are the statue of Newton and the collection of fishes made by Charles Darwin on his voyage on the "Beagle." The industrial towns of *Birmingham* and *Leeds* are not without historical interest. In the former, in the years following 1780, a group of friends used to meet to discuss scientific ideas of the time. Among them were James Watt, Erasmus Darwin and Joseph Priestley.

Priestley's home in Birmingham was burned by a mob in 1791, causing his emigration, a few years later, to Northumberland, Pennsylvania, U. S. A. Leeds was a former home of Priestley's, and the place where most of his researches on "airs" were made. Going on up into Scotland, the country of early geologists, we reach Edinburgh. James Nicol studied at the University in 1825, and Hugh Miller made his home in the city from 1839 to 1856. Nicol died in Aberdeen in 1879, having taught in the University there since 1853.

HOLLAND—*Leiden* and *Haarlem* are the cities associated with the late Professor Lorentz. He taught at the University of Leiden from 1878 till his retirement in 1923, during his later years he lived in Haarlem and died there February 4 of this year. Amsterdam University was the residence of Hugo de Vries when his studies of *Oenothera*, the Evening Primrose, were made, and when he discovered Mendel's paper on the (*Turn to next page*)

Seeing Science in Germany

General Science

In Germany, land of the *Cartels*, where great trusts are tolerated and even encouraged, the economic tendency is reflected by a similar trend toward mergers in science. In Berlin, capital in the economic sense as well as the political, this tendency is especially well developed. Almost every museum, library, research laboratory, observatory, is related in some way to the *Universität*, or to the *Hochschule* (technical colleges), or to one of two or three *Institute* or *Anstalten*. The various points of interest which the scholarly tourist may wish to visit may be in widely separated quarters of the city or even in suburbs at the end of a half-hour's ride, but they all tie in with a central administrative headquarters somewhere.

The University of Berlin, for example, shelters beneath its ample aegis Institutes for Anatomy, Physiology, Neuro-Biology, Pathology, Pharmacology, Radiology, etc., as well as 24 clinics—all as parts of the medical school alone. Then there is the great Museum of Natural History, as a part of the *philosophische Fakultät*, and in the same division are Institutes for Psychology, Archæology, Chemistry, Physics, Plant Physiology,

Oceanography, and the Botanical Museum. The suburbs accommodate the Botanic Garden (at Berlin-Dahlem), the Astronomical Observatory (Neubabelsburg), and the Meteorological and Geodetic Institutes (Telegraphenberg, near Potsdam). An aeronautic Observatory is maintained at Lindenberg.

Associated with the *Hochschulen* are many collections of technical interest: railroad material, communications, all kinds of building materials, cinematography, and a host of others. Of especial interest to Americans interested in flood control is the *Wasserbau Laboratorium*, or laboratory of hydro-dynamics. The German equivalent of our Bureau of Standards is the *Physikalisch-Technische Reichsanstalt* at Charlottenburg.

At *Munich*, the traveler finds one of the greatest wonders of modern science, the *Deutsches Museum*, which is now only partly completed, though it already contains no less than nine miles of exhibits! In this vast structure one finds exhibits for each brand of science, industry and commerce. Original pieces of ancient and modern historic pieces of apparatus are shown, or else duplicates of them, in size

and material. All of the exhibits capable of so being made are arranged so that the visitor himself may operate them, and observe what happens. Among the most interesting are the original U-boat, Lilienthal's airplane, original pieces of apparatus used by Ampère, Ohm, Hertz and Röntgen, a full size model of a coal mine, full sized locomotives, astronomical telescopes, and the planetarium, described in another article.

Among the most interesting of German scientific organizations are the numerous *Kaiser-Wilhelm-Institute*, which correspond more or less with our Carnegie and Rockefeller Institutions. Each of these *Institute* is organized for a specific purpose, and the ambit of the group is broad: biology, experimental therapy, biochemistry, physical chemistry, brain research, physiology of work, metallurgy, leather research, hydrobiology, bird observatory—to mention only a few. It is easy to see that science and technology are flourishing in post-war Germany, and that the Republic is as able to make its bid for a place in the scientific sun as was the Empire that preceded it.

Science News-Letter, April 7, 1928

Scenes of Science—*Cont'd.*

laws of heredity. He has now retired and is living at *Lunteren*, at the age of 80. Holland must always be associated with Descartes in the minds of lovers of mathematics and philosophy, although one can hardly select a site for honoring his memory. In 21 years of continuous residence in the country he lived in 17 different towns.

SWEDEN—Descartes died in *Stockholm* in 1650. Berzelius made the city one of the fountains of organic chemistry, and Wöhler studied in his laboratory from 1823 to 1825. Arrhenius, who was born at WIJK (not a radio station) near Upsala, in 1859, did his work on electrolytic dissociation at the University of Stockholm, and died in that city last year.

GERMANY—*Berlin* will live in the minds of chemists and physiologists as the home of Wöhler at the time he broke the barriers between their two sciences by his synthesis of urea in 1828. Kirchhoff was professor of physics at the University of Berlin from 1875 till his death in 1887. The versatile Helmholtz was born in Potsdam in 1821, re-

turned to Berlin as professor of physics in the University in 1871, and died in the same city in 1894. *Königsberg*, though off the usual travel routes, is interesting not only as the home of Kant but as the birthplace of Kirchhoff. Helmholtz was professor of physiology at the University in 1849. *Göttingen* was the birthplace and early home of Bunsen (1811-1899), and Wöhler was professor of chemistry there from 1836 till his death in 1882. Those who are attracted to *Frankfurt* by the scientific establishments there will be interested in knowing that Wöhler was born at *Eschersheim*, nearby. *Giessen*, just north of Frankfurt, contains the laboratory which Liebig established in 1824, in its day the most famous school of organic chemistry in the world. Not far south of Frankfurt is *Heidelberg* University where Bunsen and Kirchhoff invented the spectroscope and made their spectroscopic researches in 1859-60. Bunsen died there in 1899. Wöhler was among its distinguished students, and Helmholtz was for a time professor of physiology there. *Munich* University boasted Liebig as professor of chemistry

from 1852 till his death in 1873.

SWITZERLAND—*Neuchatel* is famous as the home of the geologist and naturalist, Louis Agassiz, and the birthplace of his son, Alexander. From there they emigrated to America in 1846. *Geneva* was the home of Sir Humprey Davy at the time of his death in 1829.

FRANCE—*Strasbourg* University had Pasteur as teacher of chemistry in 1848, at the time he was interested in isomerism. He was professor of chemistry and dean of the faculty of science at the University of *Lille* in 1854, while still a young man. *Paris* is full of scientific associations. Here Descartes did much of his mathematical work. It was the home of Lavoisier, and the great group of chemists and physicists who were his contemporaries. Lavoisier worked at the Academy des Sciences, and was beheaded in the Place de la Concorde. Cuvier announced his system of natural classification of animals in lectures at the Ecole du Pantheon. The Pasteur Institute was founded by Pasteur and his fellow-workers in 1888. Pasteur died at his home in St. Cloud in 1895. His tomb in Paris, though neglected by the guide-books, will be of interest to all scientists. No less interesting is the Radium Institute where Mme. Curie works in her laboratory.

ITALY—Passing from northern to southern Italy, *Como* was the home of Alessandro Volta, discoverer of the electric battery and continuous electric current, who was born there in 1745 and died there in 1827. He was a professor of physics at the University of *Pavia* not far away. *Padua*, on the other side of the Peninsula, has the university where Galileo made his telescope through which he discovered the mountains of the moon, the four moons of Jupiter, the phases of Venus, and other wonders of the skies. At nearly the same time a young Englishman, William Harvey, was studying there for his M. D. He discovered the circulation of the blood after his return to England. *Pisa*, on the western coast, is the site of the cathedral where the inattentive young Galileo discovered the laws of the pendulum, and the Leaning Tower where, in later years, he conducted experiments on the force of gravity. *Florence* was Galileo's home during his later years, and he died at nearby *Arcetri*. In *Rome* the Ministry of Education meets in the room in which he was forced to retract his statement that the earth moves.

Science News-Letter, April 7, 1928



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