base. This is the usual position in slow-speed flight. In rare cases the fins are inclined very slightly downwards, and this "down" position is probably used for flight at highest speed. Now soaring vultures have their wings in the "up" position for slow-speed flight, and use the "flat" wing-disposition for flight at high speed.

A further resemblance between flying-fish and soaring vulture is indicated by the observation that the tips of the pectoral fins may be bent up, forming an angle of perhaps 45° with the rest of the fin, which is comparable to the bending up of the terminal quills of the vulture's wing during horizontal soaring flight.

Dr. Hankin confirms the conclusion that while there may be flapping of the pectoral fins at the start, there is none after the fish has got well under way. A speed of 10 metres per second was observed during eight seconds, and a maximum of 20 metres per second is probable. Taking advantage of species of Exocœtus with coloured pelvic fins, Dr. Hankin was able to discover how the displacement of these is used to check the velocity in both high-speed and low-speed flight. In a species with the pelvic fins small in size and placed far forwards, therefore unsuitable for checking speed or for steering in the vertical plane, the fishes at the end of their flight steer downwards by drawing the pectoral fins back through an angle of about 45°. They then plunge head foremost into the water without any visible attempt to check their speed.

It seems that flying-fishes sometimes make mistakes as to the suitability of the air for flight. They may emerge with low-speed disposition when high-speed disposition would have been appropriate; they may emerge tail "up" when they should have tried tail "down." Thus their "flights" are often involuntarily short.

University and Educational Intelligence.

LONDON.—The Ph.D. degree in the faculty of science has been conferred on the following:—Connell Boyle (Royal College of Science), for a thesis entitled "Studies in the Physiology of Fungi"; Sri Krishna (East London College), for a thesis entitled "The Condensation of Phenols with Acid Anhydrides, with Special Reference to Coumarin"; Isabel Soar (Birkbeck College), for a thesis entitled "The Structure and Function of the Endodermis in the Abietineæ"; Nellie Barbara Eales (University College, Reading), for a thesis entitled "Monograph on the General Morphology of *Aplysia punctata*"; Frederick H. Newman (Royal College of Science, and University College, Exeter), for a thesis entitled "The Absorption of Gases in the Electric Discharge Tube"; and George N. Pell (University College), for a thesis entitled "The Trajectory of Bombs Dropped from Aircraft."

THE Bureau of Education, Washington, has issued a pamphlet dealing with the opportunities for the study of medicine in the United States (Higher Educational Circular, No. 22). The system of education in the United States is first briefly surveyed, and details are given of the preliminary studies and examinations necessary in order to enter a medical school. The medical curriculum is then described, and a list of the medical schools is given, with notes on their numbers of students, graduates, and teachers, and the fees. Other sections of the pamphlet deal with the expenses incident to an education in an American medical school, social opportunities, and scholarships and loan funds. Of the 85 medical colleges in the country, about 60 are open to both sexes.

Calendar of Scientific Pioneers.

August 19, 1662. Blaise Pascal died.—A religious philosopher, mathematician, and physicist, the author of the "Provincial Letters" and the "Pensées," Pascal spent the earlier part of his life in scientific studies. He made the first calculating machine, measured heights by the barometer, and with Fermat founded the theory of probabilities.

August 19, 1822. Jean Baptiste Joseph Delambre died.—During the French Revolution Delambre with Méchain made the geodetic measurements which formed the base of the metric system. He succeeded Lalande at the Collège de France, and distinguished himself as one of the secretaries of the Paris Academy of Sciences. His great "History of Astronomy" was published during 1817–21.

August 19, 1856. Charles Frédéric Gerhardt died.—An Alsatian by birth, Gerhardt became an assistant to Liebig, held a chair at Montpellier, and during the years 1848–55 resided in Paris, where he published his "Traité de Chimie organique," which contains his important views on the structure and constitution of chemical compounds. He died at Strasbourg, where a monument is to be erected to him.

August 19, 1896. Josiah Dwight Whitney died.—Graduating at Yale in 1839, Whitney rose to a foremost position among American geologists. In 1865 he became professor of geology at Harvard.

August 23, 1782. Henri Louis Duhamel du Monceau died.—A botanist, physicist, and technologist, Duhamel du Monceau had an unrivalled knowledge of timber, and as Inspector-General of the French Navy contributed to the advancement of naval architecture.

August 23, 1806. Charles Auguste de Coulomb died.—A French military engineer, Coulomb made important researches on friction, invented the torsion balance, and discovered the laws of the attraction and repulsion of electrified bodies. He was an original member of the French Institute, and was employed by Napoleon as an Inspector of Public Instruction.

August 23, 1835. Leopoldo Nobili died.—Nobili, who was professor of physics in the Archducal Museum at Florence, is remembered for the introduction of the astatic galvanometer and the thermo-electric pile.

August 24, 1664. Maria Cunitz died.—A native of Germany, during the Thirty Years' War Maria Cunitz removed to Poland, where, with the assistance of her husband, she compiled her astronomical tables, "Urania propitia . . ." From her universal accomplishments she was called the "Silesian Pallas."

August 24, 1832. Nicolas Léonard Sadi Carnot died.

August 24, 1888. Rudolf Julius Emmanuel Clausius died.—Both famous physicists, Carnot and Clausius are among the founders of thermodynamics. The son of the "Organiser of Victory," Carnot was born in the Luxembourg in 1796, passed through the Ecole Polytechnique, and served in the Army. His essay of 1824, "Réflexions sur la Puissance motrice du Feu," called by Kelvin an "epoch-making gift to science," for many years remained unnoticed. Clausius was born in 1822, and as a *Privatdozent* at Berlin in 1850 re-stated Carnot's principle, enunciated the second law, and afterwards developed his conception of entropy. His "Die mechanisch Wärmetheorie" appeared in 1867. While Carnot's work was the outcome of his study of the steam engine, that of Clausius led to the application of scientific principles to its improvement. The kinetic theory of gases also owes much to the labours of Clausius, who for some years was professor of natural philosophy at Bonn, where Hertz was his successor. E. C. S.