

Another subject of study was plethysmography. A. Fick previously had used a plethysmograph to study variations in the volume of an organ. Mosso, under Ludwig's direction, modified this apparatus, and made an elaborate study on the alterations of the volume of the human limbs under various conditions, mental and physical, or with intellectual work, for the volume of a limb does vary with mental work, as Mosso conclusively showed. Later on, years after his return to Italy, in 1884, he published his famous paper on application of the balance to the study of the circulation in man. He constructed a balance so subtle that when a person was extended on it and delicately poised, mental work caused the head end to descend from an afflux of blood towards the brain.

In 1876, after his return to Italy, Mosso became professor of pharmacology in Turin. In 1880, when Moleschott was called to fill the chair of physiology in Rome, Mosso succeeded his old teacher as professor of physiology in Turin, a post he held with the highest distinction until his death. During the last few years illness incapacitated him from working in his laboratory, a matter of the acutest mental anguish to one whose untiring brain had ever new problems to investigate and solve.

The fact that in search after health he was able to devote his enforced leisure to the study of the result of excavations made in Sicily, and, above all, in Crete, was some compensation. He has left behind him a standard work on prehistoric anthropology in his "Palaces of Crete," published in English in 1907. His first laboratory was in a convent, but his boundless activity, productiveness, and the increase in the number of scholars, as well as the growing importance of his subject, led the Government to provide him with a palatial laboratory, one of the finest, most artistic, and æsthetic and best equipped in Europe. In 1882, along with Prof. Emery, he founded the well-known "Archives italiennes de Biologie," in which many of his now classical investigations were published. The first volume contains, Bizzozero's article on the blood platelets, and that of Mosso and Pellacani on the movements of the bladder. His unrivalled activity found vent in many directions in physiology; nor was this all. He was elected a senator, and often travelled to Rome to Monte Citorio to attend to his parliamentary duties, returning at night to undertake his more academic duties in Turin next morning.

The physiology of respiration early, and indeed constantly, occupied his attention. He studied the relations between abdominal and thoracic movements in 1878, periodic respiration, Cheyne-Stokes breathing in 1886. He had a special laboratory in the Regina Margherita hut on the top of Monte Rosa, 4560 metres above sea level, for the study of life at high altitudes, and the results of his prolonged and arduous labours he published in his "Life of Man on the High Alps," which was translated into English in 1898. As human beings cannot live much more than two months at a time in these altitudes, he had a fully-equipped laboratory erected on Cold'olen at 3000 metres, where much physiological, physical, and biological work was done.

In his "Diagnostik des Pulses" (1879) he made a careful study of the pulse, and in 1895 he invented his sphygmo-manometer for the study of the blood pressure in man. Amongst the most interesting of his studies on the circulation are those on that of the brain. The temperature and psychical activities of this organ he studied in 1894, and the researches formed part of the subject of his Croonian lectures in 1892.

Perhaps his work best known in this country is that on fatigue—translated into French, German, and

English—as studied by the use of his ergograph, a most valuable contribution, written with a charm of diction that one rarely finds in physiological memoirs. Mosso was a master of style, happy in his phraseology, wide and catholic in his literal tastes, a keen and loyal admirer of the poets of his beloved Italy. The bust of Dante was always present on his laboratory writing-table. His interesting work on "La Paura" ("Fear") was also translated into English. Amongst his other popular writings are "L'Education physique de la jeunesse," "Les Exercices physiques et le développement intellectuel," and "Materialismo et Misticismo."

Amongst his chemical investigations the best known are those on ptomaines (with Guaresche, in 1882), and the discovery of the fluorescent serum and the powerful toxic venom—which he called ichthyotoxin—which occurs in the blood of the Murinideæ, such as the conger eel.

In Angelo Mosso the world loses a great and distinguished physiologist, who was beloved by all who knew him, was venerated by his pupils, and by his work, both in its theoretical and its practical applications, secured for himself a reputation as an investigator and expositor such as to place him alongside that illustrious galaxy of his countrymen who have added so much to the domain of natural knowledge.

#### JULES TANNERY.

THE unexpected death of M. Jules Tannery on November 11, at the age of seventy-two, will be sincerely regretted by a much larger circle of admirers than he would have anticipated. He belonged to a type of mathematician which is not too common, because he was at the same time an original thinker, a successful teacher, and a writer endowed with an unusually clear, brilliant, and attractive style.

In England, at any rate, he is probably best known by his mathematical text-books. Of these, the "Leçons sur l'Arithmétique" is a masterpiece in its way, combining rigour of method with a charming lucidity and ease; the "Traité sur la théorie des fonctions elliptiques" (written in conjunction with M. Molk), is one of the best works on the subject suited for a beginner; while the value of his "Introduction à la théorie des fonctions" is shown by the fact that a second and revised edition has recently appeared. Tannery was essentially an arithmetician, and one main object of his work on function-theory is to show that (as Dirichlet asserted) all its results are deducible from the notion of a whole number. A more philosophical work, dealing with the same class of ideas, is his "Rôle du nombre dans les sciences," which he appears to have regarded as his greatest work. As might be expected, he took a part in the controversies aroused by Cantor's invention of transfinite numbers.

M. Picard, in announcing the death of their colleague to the Academy of Sciences, referred in appreciative terms to the notices of mathematical works and memoirs contributed by Tannery to the *Bulletin des Sciences mathématiques*. He said:—"Elles ne sont pas toutes signées, mais on ne peut s'y tromper, car elles portent sa marque si personnelle. En les réunissant, on aurait un tableau fidèle d'une partie importante du mouvement mathématique dans ces vingt-cinq dernières années."

Tannery's last official post was that of vice-principal of the Higher Normal School, and he was elected an Academician in 1907. M. Picard bears witness to his amiable, witty, and engaging character in private life.

G. B. M.