

developing methods of manufacture of vitreous globes for incandescent gas lighting, which he brought to a successful conclusion only shortly before his death.

Quiet and diffident in manner, slight in build, and far from robust, Dr. Bottomley gave little outward sign of the strength that was in him both of character and ability, and as he published but little and never advertised himself at all, he was not well known except to his associates. By these he was recognised as a man of exceptional judgment, business ability, and integrity, and, besides "being" the Thermal Syndicate, he was a director of Kelvin, Bottomley, and Baird, of Chas. Tennant and Co., and of the Blagdon Manure and Alkali Co. He was also (until the war) a director of the Deutsche-English Quartz Schmelz G.m.b.h., which carried on the quartz fusion processes in Germany.

Dr. Bottomley was married in 1913 to Miss Dorothy Couves, and leaves a widow and two children. He was an outstanding example of the advantage of giving administrative and business responsibility to a man of character and scientific training.

R. A. S. PAGET.

PROF. MAX VERWORN.

By the death of Prof. Max Verworn at Bonn on November 23 last, a notable figure, who could ill be spared on account of the breadth of his outlook, has been lost to biology. Verworn had just completed his fifty-eighth year, having been born in Berlin on November 4, 1863. He received his school and early university education in his native city, and graduated Ph.D. in Berlin in 1887, and later M.D. in Jena in 1889. After graduation in medicine, his interests being then largely zoological, he paid a long visit to Villefranche and Naples, and later continued his investigations along the coast of the Red Sea. On his return to Jena Verworn was appointed assistant in the Physiology Institute, and in 1891 was duly approved as *Privatdozent*. After a few years' work, including a second visit to the Red Sea, he became extraordinary professor of physiology in Jena in 1895. In 1901 he was called to Göttingen as professor of physiology, and in 1910, on the death of Pflüger, he became the professor of physiology at Bonn. Verworn received many academic distinctions. In this country he was an Sc.D. of Cambridge and an LL.D. of St. Andrews. He was also an honorary or corresponding member of many of the Continental scientific societies, in Moscow, Vienna, Rome, Halle, etc. Twice he was invited to visit America, on the second occasion as Silliman lecturer in the University of Yale.

Verworn owed his special, almost unique, position in physiology to the catholicity of his interests. He had been impressed from his earliest student days with the value of zoology, and much of his best and most original work was done in the physiology of the invertebrates of all classes, although perhaps those of the marine fauna engaged his warmest attention. He used this material with skill and ingenuity in his interpretation of physiological problems in general. Undoubtedly the work by which

Verworn is best known is his "Allgemeine Physiologie," which was translated into English by Prof. Lee. This book, which is a mine of information in the lesser-known aspects of general physiology, appeared in 1894, and was immediately recognised as a work of outstanding merit. It has gone through many editions. His Silliman lectures on irritability brought together his special views on the nature and function of the nervous system, a subject which had interested him from the first; indeed, one of his earliest contributions (in 1889) to attract attention bore the title "Psychophysiologisch Protistenstudien." He also held very definite views on the functioning of living tissue in general, and his name will always be associated with his interesting biogen hypothesis.

That Verworn's interests were not confined to the study, in any strict sense of the word, of ordinary physiology and zoology is evidenced by his writings on the psychology of primitive art and on the evolution of the human spirit. Certainly for many years before the war he was very interested in archaeological and ethnological problems, and the writer has a most vivid memory of a conversation with Verworn, in which he gave an extraordinarily enthusiastic account of a visit to several of the Indian tribes resident in the south-west of the United States. He had visited these tribes to study the nature of their art, more particularly their colour combinations. Verworn also had a profound knowledge of the history of early art in Europe, and a very genuine interest in numismatics.

In spite of his many interests, Verworn managed to edit, with success, two physiological journals, one the *Zeitschrift für Allgemeine Physiologie*, founded by himself, and later, after his appointment to Bonn, the famous Pflüger's *Archiv*. E. P. C.

COL. WILLOUGHBY VERNER.

COL. WILLIAM WILLOUGHBY COLE VERNER, who died on January 25 at his home at Algeciras, was in many ways a remarkable man. He was a product of the Army at its best and a living denial of the too-often-quoted saying that Army officers think little and have no interests beyond sport and their "shop." Col. Verner will be remembered not only as the writer of the history of the Rifle Brigade and as the inventor of the luminous magnetic and prismatic compass and of other aids for military sketching and surveying, but also as an authority on the wild birds of South Spain and the discoverer of many of the rock shelters in South-West Spain that had been painted and decorated by Neolithic or Eneolithic man. Articles on the latter were published by him in the *Saturday Review*, and these brought him into relationship with the Abbé H. Breuil. The result was a careful survey of the whole district with regard to prehistoric man. Col. Verner, while bird-hunting near Ronda, had once noticed paintings on the walls of a cave near the top of the "sierra." This led to the publication by Breuil, Obermaier, and Verner of the first of an interesting group of Palæolithic cave paintings, which recall the northern group of France and Cantabria. But the memory of Col. Verner

will always live in the hearts of those who were privileged to be with him for a time at his little shooting cottage near the Laguna de la Janda. His kindness, knowledge, and interest in everything were especially noticeable, but at the same time his soldierlike love of order was never absent. Woe betide the guest who returned the salt-jar to the

place where the pepper-pot should have been! The Army has lost a competent officer who continued to work for it in many ways after being physically incapacitated during the South African War from active service; science has lost an earnest follower; but, above all, some of us have lost a real friend.

M. C. BURKITT.

Current Topics and Events.

SIR FRANCIS GALTON was born on February 16, 1822, in the same year as Mendel. The Eugenics Education Society is celebrating the anniversary in a dignified way with addresses on Galton's contributions, not only to eugenics, the cause that was nearest his heart, but to statistics and geography as well. Galton was in more than one striking way the complement of his cousin, Charles Darwin, but especially in this respect: that his imagination was fired with the idea of man's evolution going on. Darwin thought more perhaps of the descent of man, Galton of the ascent; but it is very interesting that the *doyen* among eugenists should be Darwin's own son. The Eugenics Education Society has been fortunate in having had Major Leonard Darwin for many years at its helm. Of course, Charles Darwin and Francis Galton were entirely at one, though the angle from which they regarded man was a little different. What Galton grasped so firmly was the idea of *man evolving*, and that no longer mysteriously, but under the influence of factors which are discoverable by, and amenable to, scientific methods. He had the vision of the control of life, of applying our knowledge of the factors in evolution to the guidance and acceleration of that evolution. This was to him, as he said, "a virile creed, full of hopefulness, and appealing to many of the noblest feelings of our nature." In celebrating the anniversary there is reason for congratulation and encouragement, for Galton's doctrines have made rapid headway. It must be confessed, however, that the need for more enthusiasm is great. Thus we see from Prof. Karl Pearson's letter to the *Times* of January 18 that although the Galton Laboratory is nobly housed, its undertakings—especially in the way of publication—are sadly hampered by lack of funds. The same hindrance affects the Eugenics Education Society, and it is plainly a matter for regret that new knowledge of high importance should be lying unpublished and that educational efforts to diffuse the "virile creed" should have to be slackened when they are so urgently needed.

ON February 19 occurs the tercentenary of the death of Sir Henry Savile, to whom Oxford owes the foundation of the Savilian professorships of geometry and astronomy. Accounted by his contemporaries—among whom were Casaubon and Scaliger—"a man of admirable skill in the Greek and Latin languages and a laborious searcher and generous publisher of the remains of venerable antiquity," Savile was one of the first scholars of the age. Born near Bradley, Yorkshire, in 1549, he matriculated at Brasenose College, became a fellow of Merton

College, was elected a proctor of the University, and at one time taught Greek to Queen Elizabeth. From 1585 he was Warden of Merton, and from 1596 Provost of Eton, holding both positions until his death, which took place at Eton. The chairs of geometry and astronomy were founded by him in 1619, Briggs being appointed to the former and Bainbridge to the latter. Among the distinguished men who have held one or the other have been Halley, Sir Christopher Wren, Bradley, Baden-Powell, Pritchard, H. J. S. Smith, and Sylvester. Before Briggs took over the duties of the chair of geometry Savile himself delivered thirteen lectures upon the first eight propositions of Euclid's "Elements," and these were published in 1620. Though Savile's contemporary, Sir Henry Billingsley, sheriff and Lord Mayor of London, had published the first English translation of Euclid's "Elements" in 1570, and the chair of geometry at Gresham College had been founded in 1596, the preamble to the deed of foundation of the Savilian professorships stated that "geometry is almost totally unknown and abandoned in England."

A BILL was introduced in Parliament on February 8 providing that summer time should begin on the last Saturday in March (or, if that is Easter Eve, on the preceding Saturday) and end on the first Sunday in October. These dates have been fixed in agreement with France and Belgium, as a difference in the dates causes confusion in through services. Many astronomers suffer some inconvenience from the use of summer time, but probably most of them would make little of this if they were persuaded that the majority of the community recognised it as a boon. All must agree that, if used, it is well to have its beginning and end fixed in a regular manner. On theoretical grounds, of course, the principle of summer time does not differ from that accepted long ago, when Greenwich time was introduced for the whole of Great Britain. This involved the use of a standard meridian, differing for some places 7° from the local one, and the increase from 7° to 22° is a matter of convention; the first has no more basis in theory than the second. On scientific grounds the main objection to summer time is the confusion due to the varying standard, and the measure now proposed should do something to remove the difficulties thus caused.

ON January 24 Mr. T. East Lones, of the Patent Office, read a paper before the Newcomen Society on "Mechanics and Engineering from the Time of Aristotle to that of Archimedes." Aristotle contains little of interest to engineers, but it was the extraordinary