

## Obituary.

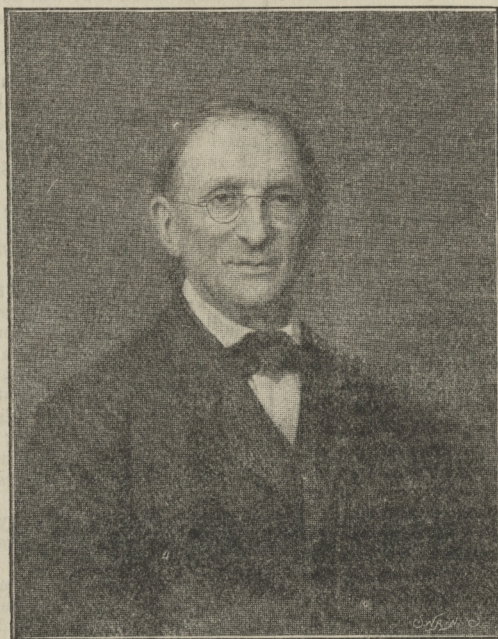
### PROFESSOR CARL LUDWIG.

THE death of Professor Carl Ludwig has deprived the world not only of its greatest teacher of physiology, but of one whose labours in this department of science have been of the utmost service to practical medicine. Numerous and important as the discoveries which Ludwig and his scholars have made, the most important work of his life will nevertheless be his introduction of self-recording instruments into the domain of physiology. With characteristic generosity he was always careful to bring prominently forward the works of his predecessors, and he venerated Stephen Hales, the English country clergyman who first measured the pressure of the blood in a glass tube, as the pioneer who first estimated physiological processes quantitatively.

Ludwig's invention of recording the oscillations of blood pressure in animals by a pen swimming on the surface of a manometer was followed in a few years by the sphygmograph of Vierordt and the elaborate apparatus of Helmholtz for estimating the rate at which a stimulus travels along nerves. All the recording instruments—and they are now very numerous—by which the various movements of living beings write their own record automatically are directly descended from the kymograph of Ludwig. The great object of his life was to withdraw the phenomena of physiology from the haze of fancy and incertitude in which they were up to his time more or less enveloped, and to bring them into a line with the well-known phenomena of physics and chemistry. To this end his three friends, to whom he dedicated his Text-book of Physiology—Professor Brücke, Professor Helmholtz, and Professor Du Bois Reymond—also worked, and the effect of the labours of this band upon physiological science it would be impossible to over-estimate. To this object Ludwig devoted the whole of a long life of tireless industry, working almost to the last with wonderful vigour. A Hessian by birth, Carl Friedrich Wilhelm Ludwig studied at Marburg and Erlangen. He graduated at Marburg in 1839 at the age of twenty-two, and after holding minor posts in that quiet university town he was appointed Professor of Comparative Anatomy in 1846. In the following year he invented the kymograph, and not only occupied himself in original researches, but initiated in the work several pupils, amongst whom may be mentioned Adolf Fick and Conrad Eckhard, now Professors of Physiology in Würzburg and Giessen respectively. The reputation he acquired caused his stay in the small town of Marburg as Professor to be short, for in 1849 he was called to the much more important position of Professor in Zürich. Hither his scholar Fick followed him, and here also he trained, amongst other distinguished pupils, Lathar Meyer (the distinguished chemist), Westphal (the neurologist), and Cloetta (Professor of Materia Medica). In 1855 he was called to a still wider sphere, and went to

Vienna as Professor in the Josephinum. Amongst his pupils here were Professors Czermak, von Recklinghausen, W. Kühne, Politzer, Leber, Stephan, Kupffer, Schwanda, Jendrassik, Setschenow, Einbrodt, Holmgren, Kowalewsky, MacGillavry, Preyer, and others, through whom his teaching was spread and his influence extended throughout Austria, Hungary, Germany, Russia, Sweden, and Holland. After ten years' work in Vienna he was called to Leipzig, where, under his direction, the Physiological Institution soon became a centre of attraction to which physiologists flocked from all parts of the world. Hither he came in April, 1865, and here in April, 1895, he died.

These thirty years were a time of steady work, hardly broken even by autumn holidays, for the annual vacation was the time chosen by professors in other universities to come to enjoy Ludwig's genial society, to see what new work he was doing, to learn from him new methods, and sometimes to make a short research under his direction. The list of those who worked with him at Leipzig is too long to quote. Amongst his English and American pupils may be mentioned in the order of time, Lauder Brunton, Coats, Bowditch, Rutherford, Moseley, Ray Lankester, Stirling, Minot, Gaskell, Ward, Cash, Sewall, Meade Smith, Wooldridge, Walton, Buckmaster, Carslaw, F. S. Lee, F. Mall, W. H. Thompson, and Vaughan Harley. The number of his pupils altogether was considerably over two hundred, and by pupils we understand not those who had simply listened to his lectures, but men who had worked with him and been trained by him to plan out original researches for themselves as well as to perform the experiments necessary to carry them out. The patience, the kindness, the self-sacrifice he showed in the training of his pupils can hardly be imagined. Though much of the work was done by his own hand, he published it under the name of his pupils, and there is consequently a tendency to under-estimate its vast amount. It would be as impossible to enumerate his researches as to name all his pupils; all that can be done here is to indicate the general



PROFESSOR CARL LUDWIG.

lines of work. These were a systematic investigation of the circulation of the blood and lymph, the alterations in the composition of these fluids as they flowed through the organs and tissues of the body, the secretion of glands and excretion by the kidneys. To him and his pupils we owe most of our knowledge regarding the conditions which affect the force and frequency of the heart, the contractility of the vessels, the position of the vaso-motor centre, the distribution of blood throughout the body, and the flow of lymph. The secretion of the saliva was shown by him to occur in the severed head of an animal provided the lymphatics around the glands were full so as to supply material for secretion. To his researches on the secretion of urine we owe our comprehension of why the urine is abundant in the high tension of gout, why it is scanty in mitral disease, and why the secretion becomes less copious when the gouty heart begins to fail and the arterial tension to fall. In order to study accurately the changes in the blood and lymph he devised the plan of keeping up an artificial circulation in individual organs, such as the lungs, kidneys, and liver. By this method new knowledge was also gained regarding the contractile power of the bloodvessels apart from



any nervous centre. The methods introduced by Ludwig into the study of physiology have also proved fruitful in pharmacology, and it is through their employment that any exact knowledge of the action of medicines on the heart and circulation which we now possess has chiefly been obtained. When we compare our present knowledge of the conditions which affect the circulation and of the means by which we can influence it with what it was when Ludwig began his work, we can guess, though we can hardly estimate exactly, how much practical medicine owes to him. His personal character was such as is very rare in any country and at any time, for to extraordinary insight and mental power he united a charm of manner, kindness, and courtesy which made all those who worked with him his life-long friends; while the example he showed of devotion to the search after truth, of self-sacrifice, and of generosity was such that they could hardly do otherwise than try to follow in his footsteps. His death will be deeply mourned all the world over, and the only consolation is that he died, as he would have wished, before his eye was so dim or his natural strength so abated that he could no longer engage in the work which was to him at once a duty and a delight.

#### ARTHUR EDWARD DURHAM, F.R.C.S.

THE annus medicus has so far been sadly remarkable for the number of deaths among leaders in medicine and surgery. Already the profession has had to lament the loss of a reigning and a past president of the Royal College of Surgeons of England, a leader in the field of State medicine has laid down his arms; and the whole scientific world is the poorer for the death of that master in physiology, Carl Ludwig. Following these comes the news of the death of one who, if not so prominently before the world as those already mentioned, was ever ready, by his skill, his sympathy, and his purse, to help the afflicted or the needy.

Arthur Edward Durham was born in 1833 at Northampton. He was not originally intended for the medical profession, and was at first employed in a bank. This occupation, however, proving distasteful to him, he entered at Guy's Hospital as a medical student when about the age of twenty—a late age in those days at which to commence. He also studied at the University of London, being a prizeman in 1854 and passing his first M.B. examination in 1857. For Mr. Hilton, whose favourite pupil he was, he did many excellent and elaborate dissections to show the nerve supply of joints. These were undertaken to illustrate the now well-known lectures on "Rest and Pain," in which Mr. Hilton alludes to his colleague's painstaking work as follows: "The first edition, in which I had the kindly and liberal help of my personal friends, Dr. Daldy and Mr. Durham, was soon out of print." Among Mr. Durham's earliest work were researches on the physiology of sleep. He trephined the skulls of dogs and inserted glass into the opening so as to reproduce, as far as possible, the physical conditions during life. Observations made after this procedure convinced him that the cortex of the brain was anæmic during sleep, not congested, as had been generally supposed. The results of these researches were embodied in a paper published in the Guy's Hospital Reports for 1860, as was also an excellent paper on Movable Kidneys, which may still be consulted with profit. With regard to his handiwork as a surgeon he was bold, prudent, and skilful; he particularly excelled in operations for recto-vaginal fistula, harelip, lithotomy, and abdominal surgery. His remarkably long fingers, that seemed to have eyes in their tips, his flexible wrist and sinuous movements of the hand made him powerful, searching, and graceful in all his manipulations, while his invention of the lobster-tail tracheotomy-tube has proved of great value. Throughout his hospital career, whether as student, dresser, or teacher, his kindness of heart and willingness to assist others endeared him to many, while as a teacher of anatomy he was unrivalled. To his patients, whether rich or poor, he was always the same, ever unsparing of himself and his skill. Neither did he only look after his patients simply as a surgeon, but always endeavoured to give them mental comfort as well as physical by supplying them with interesting books or by helping with his purse those who their breadwinners being laid aside, would otherwise have felt the pinch of poverty. Dr. Hilton Fagge, who

was long associated with him as editor of the Guy's Hospital Reports, shortly before his death said to a colleague, "Durham has just been to see me. I think he is the kindest man I ever knew," and this judgment was amply justified after his premature decease. Mr. Durham was never a strong man, and for many years suffered from attacks of vomiting, the cause of which was never discovered. He was also exceedingly deaf, an affliction which was a great trouble to him, but which, so far as his private practice went, was greatly mitigated by the unselfish and never-failing labours of his brother Frederic. For several years he was subject to frequent attacks of bronchitis, which ended in considerable pulmonary emphysema. During the last winter he had more than one attack, but with his indomitable spirit was ready for work again and again. On the Saturday before his death he enjoyed a long drive with his wife and on Sunday afternoon took a walk with an old friend. That evening, however, he was very ill, and after a restless night, with much coughing and distress, was found by a colleague, who was then sent for, to have pneumonia of the right lung. During the whole of Monday his condition became more and more hopeless, and he died early on Tuesday morning (May 7th). The funeral service will be held to-day (Friday) at St. George's, Hanover-square, at 1 P.M., and a special train will leave Waterloo at 2.45 P.M. to convey the remains to Woking, when they will be cremated. Mr. Durham leaves a widow and one son, who has already made his mark in his father's profession.

Mr. Durham held the following appointments and offices:—At the Royal College of Surgeons of England he was elected as a member of the Council in 1884, and held that office at the time of his death; he was vice-president in 1892-3, but was never an examiner. At Guy's Hospital he was demonstrator of anatomy; assistant surgeon in 1861; full surgeon in 1872; and consulting surgeon in 1894. He was president of the Students' Club and used to attend nearly every meeting. He was interested in every movement connected with the welfare of students, and was always ready to take the chair at any of their meetings or to put himself to any inconvenience to be of use to them. He was president of the Clubs' Union until last year, when he retired. Guy's Hospital was the first to start a union to amalgamate the various social institutions connected with the hospital. The Students' Club is the largest constituent institution of the Union, and Mr. Durham as its president was brought into contact with every student. He was also president of the cricket club. Almost the last meeting he attended was the ordinary general meeting of the Students' Club, held on March 26th, when three hearty cheers at the end of the meeting testified to his popularity.

In addition to the literary work alluded to above he contributed articles on Intestinal Obstruction to "Quain's Dictionary of Medicine"; articles on Diseases of the Nose and the Larynx to "Holmes' System of Surgery," second edition; and, amongst others, a valuable paper in the Transactions of the Royal Medical and Chirurgical Society on "Section of Laryngeal Cartilages for Removal of Morbid Growths."

#### SIR G. BUCHANAN, M.D. LOND., LL.D. EDIN., F.R.S.

THE somewhat sudden and unexpected death of Sir George Buchanan, late medical officer to the Local Government Board, has removed from our midst one of the most distinguished leaders in that branch of medicine which has to do with the prevention of disease and the promotion of public health. Conscious of failing health, he resigned his official post early in 1892, and recently under the advice of Dr. Ringer and Mr. Pollard he underwent an operation performed by the latter. The operation was quite successful, and convalescence seemed all but established, when on Sunday morning last, the 5th inst., he suddenly expired from heart failure at the age of sixty-four. Sir George Buchanan was a student of University College, where he greatly distinguished himself, and of which body he became a Fellow in 1864. At the London University he graduated B.A. in 1854 and M.D. in 1855, having at his M.B. taken three gold medals and two scholarships. He became physician to the London Fever Hospital and to the Hospital for Sick Children, Great Ormond-street, and for many years he held the post of medical officer of health to St. Giles. It was with credentials such as these that he first commenced work in the Medical Department of the Privy Council under Sir John Simon—a chief whom he