

of astronomers. He was entitled to all the renown which he acquired. For though others may have entertained similar views and expressed them more or less distinctly, they fell short of demonstration. Prof. Kirkwood, for example, had put the pertinent question, "May not our periodic meteors be the débris of ancient but now disintegrated comets, whose matter has become distributed around their orbits?" At a moment when we are remembering with gratitude the eminent services of the distinguished Italian astronomer, there is no necessity to stir old controversies; but when so many, from the time of Halley, have been so near a solution of the puzzle, it may quicken our appreciation of his genius to remember that he carried the question one step beyond his predecessors, removing it from the grounds of conjecture to the certainty of conviction. In this connection it is not out of place to recall the remarkable series of letters that Schiaparelli addressed to Father Secchi in 1866, models of close reasoning leading to a successful result. But as is frequently the case when a brilliant discovery is made, it is possible to detect a certain amount of luck contributing to the final outcome.

Schiaparelli's crowning success was the recognition of the similarity of the orbit of the August meteors with that of the comet of 1862. That this particular comet of long period should have returned to the sun only a few years previously to the discovery, and that its path had been well determined, was a most fortunate circumstance, and one that not only strengthened the evidence of identification, but affected the popular estimate of the certainty of the result. Similarly, with the near coincidence of the return of the comet of 1866 with the great November shower, and less conspicuously that of the 1861 comet with the April Lyrids, astronomers had the advantage of dealing with trustworthy elements. If these comets had passed through perihelion without being observed an important link would have been wanting in the chain of evidence. As it is, these earliest cases of identification are the most conspicuous and the surest examples of a relation, as significant as it was unexpected. For his part in the happy result Schiaparelli was deservedly awarded the gold medal of the Royal Astronomical Society in 1872.

In some other directions the work of Schiaparelli has not received the same complete recognition. In 1877, when Mars was in a favourable position for observation, he announced the detection of the famous canals which have since been the subject of fierce dispute and controversy. Whether these "canals," interrupting the continental areas, are existent and permanent phenomena has been much questioned; though the doubts expressed do not relate so much to the existence as to the interpretation that has been placed upon them. Schiaparelli regarded the "geminations" of the canals as a periodical phenomenon depending on the seasons, and was firmly convinced of their alternate obliteration and reappearance. The only point on which we need insist here is the effect that his industry and acuteness of vision have had on the development of astronomical observation. It has been the means of attracting a vast amount of attention to the planet, has enormously increased the activity of observation, and led to the training of a class of observers, who have taken up the subject of planetary markings with avidity. Schiaparelli has written much on the appearance of Mars, and a very large literature has collected round this subject, due largely to his initiative.

Another subject with which his name will be connected is the attempt to derive the times of rotation of Mercury and Venus. Our information on this topic

is vague, and the data uncertain. Notwithstanding the care bestowed on the observations, and the plausible nature of his deductions, his results have been accepted with some hesitation. From his patient watching, and from the length of time devoted to the study, his conclusion that Mercury turns on its axis in the same time that it revolves round the sun is entitled to very great consideration. This result was published in 1882, and it was not until some years later, 1890, that he declared that Venus behaved in a similar manner to Mercury. The long interval showed that Schiaparelli did not jump to conclusions, and the limits he assigned to the rotation, between six and nine months, prove that he was not inclined to accept a hypothesis, however specious, in favour of the results of observation.

These three conclusions, having reference to the connection of meteors with comets, to the surface markings of Mars, and to the velocity of rotation of the interior planets, are no small achievement in the life of one astronomer. It need not be said that they do not exhaust his scientific activity. A vast amount of routine work, of double-star measurement, and of the position of planets, stands to his credit. He was the author of some 250 papers in various journals, and his memory is as much entitled to our respectful homage for his industry as for his originality.

W. E. P.

PROF. J. G. GALLE.

WITH deep regret we have to announce the death, on July 10, at ninety-eight years of age, of the veteran astronomer Prof. J. G. Galle, the doyen of the Associates of the Royal Astronomical Society, into which body he was elected in 1848. For many years he had been connected with the Berlin Observatory, and will be remembered as the last of the little band of astronomers who were associated in the discovery of Neptune. Galle it was who had the good fortune to carry to complete fruition the successful analyses of Adams and of Le Verrier. It was his lucky chance to compare Bremiker's map with the sky, to detect the planet, and establish its identity by determining the motion. He long outlived all his companions and associates in that historic scene enacted in the Berlin Observatory on September 23, 1846, the antecedents of which have been told so many times that it is unnecessary to refer to them here more particularly. It is more pertinent to recall, as more likely to have been forgotten, that he was one of the first to have seen the "crape" ring of Saturn. When this discovery was announced in 1850, simultaneously by Bond and Dawes, Galle directed attention to some observations he had made twelve years earlier, in 1838-9, in which he had actually measured the diameter of this interior dusky ring. The observations were communicated at the time to the Berlin Academy, but Galle did not insist on their importance, as he could not persuade himself that the phenomenon was permanent and not due to the effect of contrast.

From Berlin, Galle went to Breslau, and there he proposed that method of determining the solar parallax, by observations of small planets, which has since proved so successful. His earliest attempts in this direction were applied to measures of Phocaea, and later, from observations of Flora, he deduced the value of 8.87". This was at a time when astronomers were beginning to discard Encke's value of 8.58" in favour of Le Verrier's 8.95". In another direction it is not possible to overlook a very distinct service which Galle rendered to astronomy. His catalogue of cometary orbits has long been a standard work

of which many astronomers have proved the usefulness. But comets and meteors long had great attractions for the aged astronomer. It will be remembered that he was among the first to point out a connection between the April meteors and Comet I, 1861, and to direct attention to the fact that Biela's comet would explain the appearance of the Andromeda shower.

Galle remained at Breslau in full scientific activity until 1897, when he retired to Potsdam after a long life earnestly devoted to astronomy, the interests of which he did much to forward by his zeal and energy.

THE HON. CHARLES STEWART ROLLS.

IT is with deep sorrow that we have to record the death of the Hon. C. S. Rolls by an accident on Tuesday last, during the aviation meeting at Bourne-mouth. It seems that Mr. Rolls went up in his biplane for the alighting competition, and during the descent the newly fitted tail-piece of his *aéroplane* suddenly broke, and the whole machine collapsed and fell to the earth from a height of forty or fifty feet. Mr. Rolls was picked up unconscious and died almost immediately from concussion and laceration of the brain.

Charles Stewart Rolls was the third son of Lord and Lady Llangattock, and was born in 1877 and educated at Eton and Trinity College, Cambridge. From his early youth he was deeply interested in things mechanical, and his brief career, so sadly brought to an end, shows how successfully he utilised his mechanical capacity.

Different from many men, Charlie Rolls, as his friends called him, when he set about doing anything, always entered deeply into the subject in a thoroughly scientific manner. Whether the object on hand was connected with cycling, ballooning, motoring, or aeroplaning, in the last two of which he was a pioneer, it was always the same, and his mind was continually bent on finding out the "whys" and the "wherefores," and improving the existing state of things. The thoroughness with which he was always associated was strongly brought to my notice in the many balloon trips that I made with him, and his inquiring turn of mind was often displayed when perched up aloft in the clouds. Perhaps the best example is instanced in the quiet manner in which he spent weeks in practising gliding before finally mounting the full-sized *aéroplane*.

It has been said of Rolls that he was born restless, and those who knew him know how true this description was. Yet he was never flurried, but always calm and collected. It was this trait in his character that probably made him so successful in his manifold ventures.

In the death of Rolls, Britain has lost her most daring and brilliant aviator, and his friends mourn the loss of a dear comrade. WILLIAM J. S. LOCKYER.

NOTES.

WE congratulate Sir William Crookes, F.R.S., on the new honour conferred upon him, namely, that of appointment to the Order of Merit, announced in the *London Gazette* of Friday last.

THE death is announced, at the age of forty-eight years, of Prof. Hugo Erdman, professor of inorganic chemistry in the Berlin Technical High School.

THE annual meeting of the Imperial Cancer Research Fund will be held at the Royal College of Surgeons on Wednesday, July 20, Mr. A. J. Balfour presiding.

NO. 2124, VOL. 84]

THE *Globe* states that Herr Frick, who for many years has been engaged in exploration and scientific research, particularly in South America, where he studied the habits and customs of the Indian tribes, has been murdered by Indians in southern Bolivia.

THE death is announced in the *Athenaeum* of Prof. T. Zona, of the University of, and observatory at, Palermo; also of Prof. A. P. Sokoloff, formerly the holder of the chair of geodesy at St. Petersburg, and more recently the vice-director of the Pulkowa Observatory. Prof. Sokoloff retired from the latter position in 1905 in consequence of ill-health.

THE following officers of the Royal Society of Medicine were elected last week for the year beginning on October 1 next:—*president*, Sir Henry Morris, Bart.; *honorary treasurers*, Sir W. S. Church, Bart., and Sir F. H. Champneys, Bart.; *honorary librarians*, Mr. R. J. Godlee and Dr. Norman Moore; *honorary secretaries*, Dr. A. Latham and Mr. H. S. Pendlebury.

AT the annual business meeting of the Museums Association, held last week in York, Mr. H. M. Platnauer was elected president, and Messrs. C. H. Hunt and Deas vice-presidents. A resolution was adopted by the meeting expressing the desire that, in any revision of the grants-in-aid to provincial museums, the Board of Education would consider the advisability of continuing assistance towards the purchase of science objects.

AMONG the communications to be brought before the eighth International Physiological Congress at Vienna in September next are the following:—demonstration of method of testing colour perception spectrometer and demonstration of lantern test for colour-blindness, by Dr. Edridge-Green; the changes produced by radium in normal cells, by Dr. A. S. Grunbaum; and the summation of stimuli, by Drs. F. S. Lee and M. Morse.

THE thirty-ninth meeting of the French Association for the Advancement of Science will be held at Toulouse on August 1 to 7. The president for the year is Prof. C. M. Gariel. Among the names of the presidents of the numerous sections, we notice the following professors of the University of Toulouse:—Prof. Emile Mathias, physics; Prof. Victor Paquier, geology; Prof. M. Leclerc du Sablon, botany; and Prof. Ch. Fabre, agronomy. M. Emile Marchand, the director of the Observatory of Pic du Midi, is the president of the section of meteorology.

THE annual meeting of the British Pharmaceutical Conference will be held at Cambridge on July 26 and 27. In his presidential address, Mr. F. Ransome will deal mainly with the cultivation of medicinal plants and with medicinal plant investigation. Among the subjects of papers promised for the meeting are:—the bacteriological testing of disinfectants; an insect pest in belladonna; the proposed essential oil monographs; phosphoric acid and ammonium phosphate; the limitations of water analyses reports, both bacterial and chemical; and note on the periodicity of the properties of the elements: new arrangement.

WE have been favoured with a copy of the preliminary programme of the fifth International Congress of Photography, which is to be held in Brussels on August 1 to 6 next, from which we learn that section i. (organised by the Société française de Photographie) will deal with photo-chemistry and the scientific applications of photography; section ii. (organised by the Association belge de Photographie), the technique of photography and the industrial applications of photography; and section iii.