considerable knowledge of chemistry and botany, but afterwards confined his attention more especially to physics, and lectured experimentally on this subject for several years in Trinity College. In his earlier days he was an enthusiastic Alpine climber, and this led him to direct his knowledge of physics towards the solution of glacial problems. He commenced a few years ago, in the ice-caves of Grindelwald, a series of observations on the physical properties of ice, some of the initial results of which were communicated to the Royal Society. He was never able, however, to continue, much less to complete, these observations, and perhaps the cruellest feature to him of his illness last winter was that it prevented him from spending the Christmas vacation at Grindelwald, as he had hoped to do, in carrying on measurements of ice, under the most natural conditions, in the depths of an ice-cave.

But the gain to science from Trotter's life is not to be measured by his formal contributions to scientific literature. He had a great unwillingness to write "papers." Though he served for several years as one of the secretaries, and at the time of his death was President, in the second year of office, of the Cambridge Philosophical Society, whose very life consists in scientific research, and though in the discussions at the meetings he frequently made his critical power felt, his name does not often appear in the Society's publications. He was especially interested in physiological optics, but, though he made many observations, was always disinclined to commit his results to paper. His real scientific usefulness is to be seen in his University and College work. The recent development of natural science (other than mathematical) at Cambridge is coincident in time with, and in great measure due to, Trotter's academic activity.

In the encouragement given at Trinity to natural science, in all the changes of University ordinances tending to encourage scientific research, and to place the teaching of science on a broader and firmer basis, it is easy to trace his hand. He did not always have his own way, and often thought it prudent to accept an arrangement the shortcomings of which he clearly saw; but his influence, becoming more and more powerful year by year, was always exerted to promote the growth of science in the University, for he at least had no doubt that he was thus working for the welfare both of the University and of his College. He had such a firm grasp of the dominant ideas, and was so wholly in touch with the spirit, of almost every one of the various branches of science, that each teacher and worker sought his help and trusted in his counsel. On the other hand, his conspicuous sympathy with literature and art enabled him to win from those who were strangers to science an assent which would have been denied to claims advocated by others. Happily, too, his singularly catholic mind and temper were made still more potent by a remarkable skill in handling details and conducting business. Were Maxwell now alive, he would be able to tell, as Rayleigh and Thomson can tell, how great a help Trotter was to the Cavendish Laboratory and to physics. The Regius Professor of Physic knows how often Trotter's great knowledge of the needs of medicine on the one hand, and of the capabilities of academic organization on the other, as well as his legislative ability, were of signal service in the difficult deliberations of the Board of Medical Studies. Liveing can say how much not only the very existence, but the details of construction, of the new Chemical Laboratory are due to Trotter's co-operation with himself, and Stuart will tell a like story about the Engineering School. Each science in turn brought its wants to Trotter, and seldom brought them in vain. He recognized Frank Balfour's powers as early as I did, and did more for him in his College and in the University than I could do. All my younger friends whom I am proud to think of as once my pupils, who are making their names known in physiology, in morphology, and in botany, have always looked up to him as a friend who never failed. And, as for myself, whatever I may have done at Cambridge has been done from first to last through him, and could not have been done without him: in him I have lost my oldest, truest, best helpmate.

I first came to know him a year or so before I received my appointment at Trinity College. Happening to pay a visit to Prof. Humphry, I was taken by him to call on "a young Fellow of Trinity interested in science, and especially in physiology, a capital fellow!" That "young Fellow" was Trotter. I saw, even in our brief interview, much in him to draw me to him, and he seemed to see something of the same kind in me, so that when, a year after, a sudden change in all my plans placed me within the walls of Trinity, he and I began a friendship which has ceased only with his death. All through the thirteen years during which, while working within the University, I was really outside the University, my every movement was made by and through Trotter; and since I have been Professor my every movement has been made with him. For seventeen years I have been able to make him a partner in my plans; he has shared in my hopes and soothed me in my failures; where I have been successful he has helped, and when I have refused or neglected his counsel I have generally gone wrong. When Balfour was taken I could feel that Trotter was left, and now he is gone too.

But I ought not to thrust these personal matters on the readers of NATURE, and indeed, great as my own loss is, that of Trinity College and of the University is far greater. Those who know the University and knew Trotter will feel at once how great a blow is his death at the present juncture. The University, both in its scientific and in its other work, is straitened for lack of funds: laboratories cannot be built, teachers cannot be adequately paid, research cannot be properly encouraged, because the necessary money is not at hand. At the same time the revenues of the several Colleges are suffering acutely from the depreciation in the value of land, and a movement has been set on foot with the view of diminishing the contributions of the Colleges to the University. If this movement is successful—and its success seems assured by the fact that the new Member for the University has, in his address to the electors, given a conspicuous pledge that he, with his commanding scientific authority, will support it in Parliament—it will need the wisest and most skilful handling of details to prevent the result proving disastrous to the cause of learning, and especially of scientific learning, in the University. So long as Trotter was alive we felt that we had one in whom devotion to his College was no less strong than his love for the University and for learning, and we looked to him as the man who, trusted alike by the Colleges and by the University, would be found to have skill to steer us in the difficult way before us. Now, in the darkness of his death, we seem to be driving, without a pilot, straight upon the rocks. M. FOSTER.

H. C. F. C. SCHJELLERUP.

THE Danish astronomer Prof. Hans Carl Frederick Christian Schjellerup died at the Copenhagen Observatory on November 13 after a prolonged illness. He was born on February 8, 1827, at Odense, where his father was a jeweller, and was apprenticed to a watchmaker, but by private study he succeeded in supplementing the education he had received in his native town so well that he was able to pass the entrance examination at the Polytechnic School of Copenhagen in 1848. Here he distinguished himself by his mathematical ability, and was able to finish his studies in the course of two years, when he passed the final examination in applied mathematics and mechanics. In 1851 he

was appointed observer in the old Observatory at Copenhagen, which had been built at the time of Longomontanus, on the top of a high tower, and was therefore, after the lapse of two centuries, greatly behind the times, both as to locality and instruments. A few years afterwards he was appointed Professor of Mathematics at the Naval Academy, and Instructor in Geometrical Drawing at the Polytechnic School. These appointments he retained till the time of his death, as well as his position at the Observatory, and though he was in 1875, after the death of Prof. D'Arrest, strongly urged by the Minister of Public Instruction to allow himself to be appointed Professor of Astronomy, he preferred remaining as he was, partly owing to the pecuniary loss the change would have entailed, partly because his scientific activity was untrammelled by routine duties, and left him leisure to pursue his studies in whatever direction he chose.

As long as Schjellerup had only at his disposal the instruments of the old Observatory, he chiefly occupied himself with the computation of orbits of planets and comets, among which his determination of the orbit of the comet of 1580 deserves to be specially mentioned. This was founded on a complete reduction of Tycho Brahe's original observations of the distance of the comet from stars, and of his time determinations by altitudes and azimuths of standard stars. In 1861 the new Observatory was finished, and furnished with an 11-inch refractor by Merz and a transit-circle by Pistor and Martins. With the latter Schjellerup commenced in September 1861 to observe zones of stars, chiefly of the eighth and ninth magnitudes, between $+15^{\circ}$ and -15° declination, and already in the beginning of December 1863 he had finished the observation of ten thousand stars, while the reductions had been pushed on with so much energy that the complete catalogue of mean places for 1865 was laid before the Royal Danish Society of Science a month after. When it is remembered that the author of this work during the greater part of the year had to spend three or four hours a day in teaching, it will be conceded that he made good use of his time. The star catalogue is so well known for its fulness and accuracy that it is unneccessary to dwell further on it in this place. After its completion, Schjellerup intended, and had already commenced, to continue the observations north of the limit of $+15^{\circ}$, as Bessel had done forty years before, but about this time his interests took a new direction, which made him discontinue systematic observations, while he may also have been influenced by the circumstance that the great undertaking of the Astronomische Gesellschaft, viz. the observing of all stars in the northern hemisphere down to the ninth magnitude, had just then been planned, whereby zone work on Lalande's plan became of less importance.

Schjellerup now with his usual energy threw himself into the study of Oriental languages, especially Arabic and Chinese. In the Royal Library of Copenhagen he found a manuscript of the description of the heavens by the Persian astronomer Abd-al-Rahman al-Sûfi, a work which up to that time had been very little known among astronomers. Finding that it contained a complete and careful uranometry from the tenth century, or in other words from an epoch nearly equidistant between Ptolemy and Argelander, he resolved to translate it and was fortunate enough to obtain the use of another manuscript from the Imperial Library of St. Petersburg. The work was published in 1874 by the Academy of St. Petersburg under the title, "Description des étoiles fixes composée au milieu du dixième siècle de notre ère par l'astronome Persan Abd-al-Rahman al-Sûfi." It has been found most valuable by the astronomers who of late years have studied the relative brilliancy of the fixed stars, and Sûfi's results have been systematically collated with their own by Messrs. Peirce, Pritchard, and Pickering.

The great value which this old work was found to possess for modern research induced Schjellerup to endeavour to make other observations of the ancient astronomers fruitful for the investigations of the present day. To the journal *Copernicus* he contributed three papers under the common title, "Recherches sur l'Astronomie des Anciens." The first shows that the time stars of Hipparchus had been so well selected that their culminations gave the correct time every hour of the night within a minute, the second discusses the Chinese observations of the total eclipses of the years -708, -600, and -548, while the third compares seven conjunctions of the moon with fixed stars recorded by Ptolemy, with Hansen's lunar tables. He further examined the occultations and conjunctions of planets observed by the Greek astronomers, and the principal eclipses of the Middle Ages, but these investigations appear to have been left unfinished at his death.

Among Schjellerup's minor publications should be mentioned his catalogue of red stars (first published in 1866, and in a revised edition in 1874), which appeared most opportunely at a time when the spectroscope had just commenced to be applied to the study of the physical constitution of the stars.

In addition to being a man of very extensive knowledge, both scientific and general, Schjellerup was a kind teacher and friend, always willing to assist with his vast store of learning anybody who consulted him. His memory will be gratefully cherished by those who had the good fortune to know him.

J. L. E. DREYER.

NOTES.

DR. ASA GRAY, we are sorry to learn, has been stricken with apoplexy at his house in Cambridge, Massachusetts.

SIR GEORGE BURROWS, F.R.S., died on Monday. He was in his eighty-seventh year.

WE regret to have to announce the death, at the early age of thirty-four, of Prof. Humpidge, of the University College of Wales. Dr. Humpidge was educated at the Grammar School, Gloucester, was for some years in trade, and in spare time student in science classes, where he obtained a silver medal in geology from the Department. He afterwards studied at the School of Mines, and obtained one of the three Jodrell Scholarships. In the examination for B.Sc. at the London University he obtained the second place in the honours list, and the two years' £40 scholarship. After studying with Bunsen at Heidelberg, and teaching at Hofwyl in Berne, he was appointed in 1879 to the chemistry class at Aberystwith. At Kensington Dr. Humpidge carried on some researches on the coal-gas of the metropolis, under Prof. Frankland, and in Heidelberg he took up the study of the rare metals yttrium, erbium, and beryllium, results of which were published in the Journal of the Chemical Society, Philosophical Transactions, and Proceedings of the Royal Society. His later work was the preparation of several rare metals in a state of purity for the determination of their specific heats in his calorimeter. The fire which unfortunately destroyed the College in the summer of 1885 caused irreparable loss to Dr. Humpidge, all his papers and results and chemicals being burnt, and he had also a very narrow escape from the flames in endeavouring to rescue people and property. The shock of this accident undermined his health, and although he continued to teach in temporary premises for some time he was finally obliged to visit the South of Europe for a winter, but the relief was only temporary, and he succumbed, after three weeks of great suffering, on November 30. Dr. Humpidge translated Kolbe's "Inorganic Chemistry," which has reached its second edition. Unfortunately his long illness ran away with any provision