Dr. Taylor believes in the connection advocated by Filchner between the Ross and Weddell Seas. From the account of the researches by Dr. Simpson it appears not improbable that the most important of the scientific results of the expedition will be the additions to Antarctic meteorology.

The book is illustrated by numerous excellent photographs, including some by the expert Antarctic photographer, Mr. Ponting, and also many instructive and ingenious diagrammatic sketches by Dr. Taylor. He publishes a photograph of the *Discovery* Hut in which he lived for a month, and the title directs attention to one feature which shows that the hut was not built as designed; for it is raised on supports which were only to have been used if the hut had to be erected on ice into which they could have been easily sunk.

One interesting psychic incident is recorded. At about the time when Amundsen turned back from the South Pole his compatriot Gran had a dream to that effect, and promptly recorded it in one of Dr. Taylor's books. The author regards it as a coincidence, but his remarks suggest that he is not very confident of this explanation.

PTOLEMY'S CATALOGUE OF STARS.[1]

JUST forty years ago the late Prof. Peters, of Clinton, New York, and Mr. Knobel began independently, and without either of them knowing of the other's work, to investigate the Catalogue of Stars in Ptolemy's Almagest. They soon, however, got into correspondence, and eventually met in Paris in 1887. By that time Peters had collated most of the manuscripts in Continental libraries, and Mr. Knobel then undertook to examine those in England. Peters died in 1890, and in November, 1891, most of his papers and notes bearing on the subject were forwarded to Mr. Knobel, who completed the work, and has now at last suceeded in getting it printed

Only three editions of the Greek text of the Almagest have been published, those of Grynæus (1538), Halma (1813–16), and Heiberg (1898–1903). A valuable German translation by Manitius came out three years ago. Of the Star Catalogue there have been several separate editions, the best of which is that of Baily (Mem. R. Astr. Soc., vol. xiii.). But from an astronomer's point of view no previous edition can compare with the one we are considering here, as this is founded on an examination of a great number of codices—Greek, Latin, and Arabic—and contains, besides, many other things for which astronomers looked in vain in the earlier editions.

The investigation of Peters differs from those hitherto made, as he began by calculating from Piazzi's star-places and Mädler-Bradley's proper motions the longitudes and latitudes of all Ptolemy's stars for the epoch A.D. 100, for the purpose of identifying the stars and getting an idea of the accuracy of the positions. This was done before Auwers had published his new reduction of Bradley's observations, and it would have been worth while to examine what difference the adoption of Auwers's proper motions would have made, though the main results of the investigation would doubtless not have been affected. The work also differs from all others in the number of codices consulted. In all, twenty-one Greek and eight Latin codices of the Almagest were examined, and also three Arabic codices of the Almagest, ten of Al Sûfi's Uranometry (the catalogue in which is that of Ptolemy, with a constant correction for precession), and one of Nasir-ed-din Al Tûsi's Compendium of the Almagest. Detailed notes on the first thirty-three of these codices and three photographic plates are appended; the latter help to make the reader understand the principal sources of error in the catalogue.

The original catalogue was doubtless written in the uncial Greek characters of the second century, and the most common error in all manuscripts is that of confounding the uncial alpha (=1) and delta (=4). Thus the magnitude of θ Eridani is given in all Almagests as 1 instead of 4, which hitherto has puzzled everybody, while the Bodleian Greek Almagest gives the magnitude of Sirius as 4. Errors are also caused by confusion between A and Λ (=30) or $\epsilon=5$ and $\theta=9$, etc. The Arabic MSS. are especially important for comparison with the Greek, as the errors are of a different kind. Unlike the Greeks, who wrote the minutes of longitude and latitude as fractions of a degree, the Arabs wrote the minutes in figures, and thus these two different methods form a valuable check one on the other.

The star-places finally adopted by the authors are given in three catalogues. The first contains for each star: Baily's number, the number and Latin description of the star from the Latin edition printed in 1528, the Flamsteed number and Bayer's letter, the longitude, latitude, and magnitude. The second catalogue repeats the last three items, and gives the longitude and latitude computed from Piazzi for the epoch A.D. 100, and the difference between these and Ptolemy's values; also the magnitude from the revised Harvard Photometry. The third catalogue gives Ptolemy's longitudes reduced by 2° 40′, being the difference which Ptolemy states he found between the longitudes of Hipparchus and those of his own time, and the latitudes unaltered; also the positions computed for 130 B.C. After a lengthy set of notes on various stars follow tables collating a number of codices as regards longitude, latitude, and magnitude.

Most writers have been of the opinion that Ptolemy's catalogue was nothing but that of Hipparchus, the longitudes being altered by adding 2° 40′ for precession. Peters had already published in 1877 a paper showing that modern star-places, reduced to A.D. 100 and compared with those of Ptolemy, gave a mean correction to his longitudes = +34·9′, making his epoch

[1] "Ptolemy's Catalogue of Stars. A Revision of the Almagest." By Dr. C. H F. Peters and E. B. Knobel. Pp. 207. (Washington: Carnegie Institution, 1915.)

A.D. 58 instead of A.D. 138, the alleged epoch. The year A.D. 58 is 187 years after the epoch of Hipparchus, which gives the amount of precession $= 2^\circ\ 36'$, agreeing closely with the difference of $2^\circ\ 40'$ found by Ptolemy. Mr. Knobel remarks that, as the correction could not represent positions observed in A.D. 138, this supports the view that the catalogue is simply that of Hipparchus, with a constant amount added to the longitudes.

But this conclusion is by no means certain, and was not accepted by Peters when he spoke on this subject at the Kiel meeting of the Astronomische Gesellschaft in 1887, less than three years before his death. According to the very short report in the *Vierteljahrsschrift* (xxii., p. 269), Peters said that the constant error of the longitudes might very well be due to systematic errors of Ptolemy's instruments or to faults of the method (comparison of sun and stars with the moon as an intermediary), neglect of refraction, etc. The equinoxes of Ptolemy should not be assumed to possess the accuracy required to justify the above conclusion, and it would, in fact, be remarkable if such accuracy had been attained. Peters added that stars with large proper motion, especially 40 Eridani, agreed far better with the places of the stars at the time of Ptolemy than with those at the time of Hipparchus. To these reasons for hesitating to adopt the usual conclusion we would add the common belief among the Arabs that Ptolemy had borrowed his whole catalogue from Menelaus, adding $25'$ (41 years' precession at $36''$) to the longitudes. This seems in itself a far more likely origin of the catalogue than that it should have been borrowed from one made 270 years earlier. But the problem of the origin of Ptolemy's catalogue is still unsolved.

J. L. E. D.

PROF. H. C. JONES.

THE announcement in NATURE of May 18 of the death of Prof. Harry Jones, of Johns Hopkins University, will be received by his many friends in this country with sincere regret, for his transparent honesty and sincerity, his enthusiastic nature, his kindliness, and his courtesy impressed all with whom he came in contact.

Harry Clary Jones was born in New London, Maryland, in 1865, and received his academic education in the famous university of his State. He graduated as A.B. in 1889 and as Ph.D. in 1892. The next two years he spent in Europe working in the laboratories of Ostwald, Arrhenius, and van't Hoff. Permeated with the ideas and theories associated with these names, Jones returned to America and proceeded to promulgate them with boundless energy and enthusiasm. He received an appointment on the teaching staff of Johns Hopkins University, and was in time promoted to the chair of physical chemistry. Jones was a tireless worker himself and inspired his numerous co-workers with an equal industry. During the last twenty years he published, alone and in conjunction with them, well above a hundred papers, many of them memoirs of considerable magnitude, and found time in addition to write six books (text-books and semi-popular works), several of which have passed through a number of editions.

The line of research to which he chiefly devoted himself was the study of the intimate nature of solutions. In the "ideal" solutions of van't Hoff the mutual influence of solvent and solute may be neglected. The main object of the investigations of Jones and his fellow-workers was to ascertain the nature and extent of this influence in actual solutions. For aqueous solutions Mendeleeff had advanced the hypothesis that the dissolved substance existed in the form of a hydrate or hydrates of definite composition. Jones modified and extended this idea and held that dissolved substances in general are combined with more or less of the solvent as a series of solvates. To test this "solvate theory of solution" his extensive experimental work was devised. He explained abnormally low freezing-points of concentrated solutions as due to a portion of the solvent having combined with the solute, so that the concentration in the remaining solvent was greater than that deduced from the composition of the solution, and showed that this abnormality in aqueous solutions was greatest for those substances which crystallise most readily with water of crystallisation. By the use of the grating spectroscope he showed that the absorption bands of solutions became broader (1) as the solution became more concentrated, (2) as the temperature was raised, (3) as dehydrating substances were added. In each case this would correspond to the production of simpler hydrates. He also showed that different absorption bands were obtained according to the solvent in which the salts investigated (chiefly those of neodymium, which give sharp absorption bands) were dissolved, pointing to the formation of different solvates. By means of the radiomicrometer he demonstrated finally that the water in concentrated solutions of non-absorbing salts showed a smaller absorption in the infrared region than water itself.

Of his text-books the "Elements of Physical Chemistry" is deservedly the most successful, being written in an easy, readable style, which makes it popular with the student. In his "New Era in Chemistry" he described the progress of the science from 1887 onwards, and struck a personal note which adds to the interest and pleasure of perusal.

J. W.

NOTES.

THE Paris correspondent of the *Times* states that the Committee of the Senate appointed to consider the Daylight Saving Bill has reported against the measure on the ground that the economy intended to be realised is doubtful, and that the change would cause serious inconvenience.

IN the recent debate on the Air Board in the House of Lords several references were made to the scientific side of aeronautics. This aspect of the subject is not nearly so well known and appreciated as it should be