simple comparison of positions at the extreme limits of time. It is not made clear why observations at intermediate dates, such as those of the Radcliffe Observatory, have not been used. The plan adopted seems the more strange, since the precessional variation has been applied and a comparison has been instituted. Considering the important part these proper motions were to play in the subsequent discussion, it would seem that too much care could not be exercised in their determination. These proper motions have been arranged in tables according to their amount, or the magnitude of the stars, or the character of spectrum, and, indeed, in every way that ingenuity could suggest as likely to be useful. This method of distribution cannot but be of essential service to those who wish to make further use of the material.

Next we have a determination of the precessional constants. The final result may not possess more than an academic interest, but the research is thorough and valuable. It would serve no useful purpose to enter into details, since those who are interested in such recondite questions must refer to the original sources for information, but the numerical results may be quoted, since they differ from Newcomb's values by a greater amount than would have been anticipated. For the centennial values of m and n we have:—

	m	n
Newcomb	4607".11	2005".11
Dyson and Thackeray ...	4607".57	2005".31

Another result which follows incidentally from the method of discussion is to show that, so far as this material is available, there is no reason to suspect any rotation of the brighter stars, as a whole, relatively to the fainter stars.

Lastly, the authors assign a direction to the solar motion, or rather many directions, for the material is discussed in many ways, all interesting. Here, again, we must content ourselves with the final result, which places the apex of the sun's motion in right ascension 275° and north declination 37° , referred, presumably, to the equinox of 1850.

In tendering our congratulations to Messrs. Dyson and Thackeray, and all who have been engaged in this work, we cannot help remarking that, as in the past, the Royal Observatory has distinguished itself by its energy in laboriously piling up observations, so in this instance, it demonstrates equally happily its power to make the accumulated material available for the advance of philosophical astronomy.

The title of the second book reminds us how loyally the Greenwich Observatory has served the purposes of its foundation. To determine, or to supply the means for determining, the longitude has constantly figured in its programme of work. The times have altered, the conditions of the problem have changed, and, above all, accuracy has increased, but, steadfast to its original design, the Royal Observatory has always been willing to assist in such inquiries, whether in the interests of navigation or for the purposes of geodesy. The Paris meridian seems to have been a constant source of anxiety to Greenwich, and the present volume gives the history of no less than three attempts to grapple with the difficulty. The two earlier results, gm. 20-85s. and gm. 20-79s. west of Greenwich, seem fairly accordant to the lay mind, but since they both differed in the same direction from the results of the French observers, the small discrepancy led to a third attempt in 1902, from which it appeared that Paris was west of Greenwich gm. 20-92s., with a probable error of only 0-006s. Since this probable error is equivalent to about the length of an ordinary writing table, it would seem to possess the necessary accuracy, and the problem of the distance between the meridians of Greenwich and Paris may be considered as laid aside for some time to come. The remaining portion of the book is concerned with the longitudes of Montreal, Waterville, and Canso, and of stations incidentally connected with the scheme of operations. The result is to place Montreal in west longitude 4h. 54m. 18-62s., with an uncertainty of about 20 feet. Doubtless the day will come when this error will be felt to be intolerable, but if a demand is made for a fresh inquiry, we may be sure that the best traditions of Greenwich will respond to the appeal.

W. E. P.

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ANTI-TYPHOID VACCINE.

A MEMOIR "On the Standardisation of Anti-typhoid Vaccine," by Captain George Lamb and Captain W. B. C. Forster, has just appeared (Scientific Memoirs of the Government of India, No. 21. Calcutta: The Government Printing Office, 1906. Pp. 15. Price 7d.). After reviewing the various methods which have been proposed for the standardisation of Wright's anti-typhoid vaccine, Captains Lamb and Forster come to the conclusion that the virulence of the organisms used in the preparation of the vaccines must be taken into account. Since it appears that virulence is in direct proportion to the number, or avidity for immune body, of the receptors, an estimation of these latter in any vaccine will take cognisance of the virulence of the organism from which it was prepared. Admitting this as a basis, the method of standardisation suggested by Captains Lamb and Forster is to estimate what dilution of the various vaccines when mixed in equal parts with serum is able to remove completely the bactericidal power of that serum; in other words, to determine in what dilution of vaccine the receptors completely neutralise the amboceptor content of the serum. This is carried out by preparing a number of different dilutions of the vaccine, which are each mixed with the same amount (100 c.cm.) of fresh goat serum, and left in contact for an hour at 37° C. At the end of this period a small quantum of living typhoid culture is added to each tube, the several tubes are incubated for about twenty-four hours, and then sterile broth is added to each tube in order to ascertain whether the bacilli have been killed or no, and in this way various vaccines may be compared. The memoir must be consulted for the details of the method.

R. T. HEWLETT.

UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

OXFORD.—The thirteenth "Robert Boyle" lecture of the Junior Scientific Club will be delivered by Prof. J. H. Poynting, F.R.S., on Wednesday, May 30, upon the subject of "The Pressure of Light."

Mr. J. S. C. Douglas, Christ Church, has been elected to the Radcliffe travelling fellowship for 1906.

Prof. Ritchie, fellow of New College, has been nominated as an examiner in preventive medicine for 1906, 1907, and 1908.

The 284th meeting of the Junior Scientific Club was held on May 16, when Mr. P. W. Robertson read a paper on "A New Method of Estimating Quinine," and Prof. E. G. Hill one on "Chemistry in India."

CAMBRIDGE.—The museums and lecture rooms syndicate has reported that the chemical laboratory of Gonville and Caius College will be closed at the end of the academic year 1906-7. It will therefore be necessary to provide further accommodation in the University for the students who have hitherto found places in the chemical laboratory. The museums and lecture rooms syndicate recommends that a site in the museums' grounds contiguous to the buildings of medicine should be set apart for this purpose. It is also recommended that the proposed extension of the Cavendish Laboratory should take place on a site with a frontage to Free School Lane to the north of the existing building. Lord Rayleigh's gift of 5000l. of the Nobel prize will, it is hoped, enable this building shortly to be begun.

The Vice-Chancellor has been authorised to convey to the Worshipful Company of Goldsmiths the thanks of the University for its munificent gift of 5000l., to be applied to the present needs of the University library.

The well-known authority on coral reefs and oceanography, Mr. J. Stanley Gardiner, has been nominated by the master and fellows of Gonville and Caius College to be pro-rector for the ensuing year.

Dr. Bonney will lecture at 5 p.m. on Thursday, May 31, in the Sedgwick Museum, on "Volcanoes and Man's Experience of them."

Steps are being taken for the provision of a permanent endowment to place the Balfour library in a secure position. The library owes its origin to the generosity of the family of the late Prof. F. M. Balfour, who after his death in 1882 presented his scientific books to the University for the