Results of Observations with the Zenith Telescope of the Flower Astronomical Observatory—from September 6, 1898, to August 30, 1901. By Charles L. Doolittle.

This is fourth in the series of publications by Professor Doolittle of observations of latitude. The first two contained observations from April 1, 1876, to August 19, 1895, made at the Sayre Observatory, Bethlehem, Pa.; and the last two, from October 1, 1896, to August 30, 1901, at the Flower Observatory of the University of Pennsylvania.

This series is of exceptional value as being the earliest, as well as the most prolonged, thus far made in the investigation of latitude variations. It was begun seven years before the first proposal by Fergola at the session of the International Geodetic Association in Rome, that there should be an observational test of the constancy of latitudes, and eight years before Küstner began his observations whereby the discovery of variation was first boldly announced as proved. From that beginning, the series has continued, though with some interruptions, until to-day. The charts accompanying these four publications therefore show nearly a continuous curve from December, 1889, to September, 1901. Sections earlier than 1889 may be platted from the data given. The precision of the observations is shown by a progressively diminishing probable error for a single determination of latitude ranging from ± 0″.578 at the start with an inferior 'second-hand' instrument, to ± 0″.134 at present, with a superior instrument of Warner & Swasey's construction.

Possessing fully as much interest as the latitude curve, are the seven values of the aberration constant, simultaneously deduced as a by-product from the same observations, viz.,

	″		
1889, Dec. 1, to 1890, Dec 13	20.448	± 0.014	½
1892, Oct. 10, to 1893, Dec. 27	20.551	.009	1
1894, Jan. 19, to 1895, Aug. 19	20.537	.014	1
1896, Oct. 1, to 1898, Aug. 16	20.580	.008	½
1898, Sept. 6, to 1899, Nov. 27	20.540	.010	1
1900, May 5, to 1901, Aug. 30	20.561	.008	1
1901, Oct. 1, to 1902, Aug. 18	20.510		1

The last value is a preliminary determination announced previous to publication of the observations on which it depends. The mean of these values is 20″.539, which differs only 0″.016 from the mean of all determinations thus far made by all methods included in Dr. Chandler's discussion of this value (*A. J.* 529, 530), namely 20″.523.

In view of the high degree of accuracy now attained in these observations and the prolonged period of time over which a single observer has already extended them, though beset with singular difficulties, particularly in the earlier portions of the series, it is a cause for gratification that this fourth publication does not mark the termination of Professor Doolittle's work. It is still in progress, and astronomers may confidently expect the publication of a fifth part, from August 30, 1901, onwards.

Herman S. Davis.

A Treatise on Roads and Pavements. By Ira Osborn Baker, C.E., Professor of Civil Engineering, University of Illinois, etc. First edition, first thousand. New York, John Wiley and Sons; London, Chapman and Hall, limited. 1903.

According to the preface, 'the object of this book is to give a discussion, from the point of view of the engineer, of the principles involved in the construction of country roads and city pavements.'

From this point of view we believe the work of the author extremely well done. We also believe that enough new matter and new ideas have been introduced fully to warrant this addition to the already large number of similar works devoted to this general subject.

Especially admirable is the arrangement of chapters and of articles under the chapters. This arrangement gives the table of contents unusual value, enabling the reader at a glance to observe both the presence and absence of the matter sought.

While almost every possible subject is present, we note with some surprise the absence of any detailed discussion of cements, although the use of cements in concretes and concrete foundations and for other minor

purposes in road-making is fully treated. We presume the chemistry and technology of cements have been fully treated in other works by the same author; but we think the omission in the present work of this subject has been a mistake, as many problems in road construction depend for their successful solution upon a thorough and discriminating knowledge of the nature and quality of the cements that are upon the market.

Another defect of the work of a more serious nature, arises from the attempt of an engineer to discuss problems that do not pertain to engineering. We refer to the entire discussion of the subjects embraced in Chapter XIII. This work is published in 1903, yet a careful examination of the entire chapter fails to disclose anything more recent than about two years, and most of it is ten years old. The chapter is evidently written up 'from the book,' instead of from actual experience and personal knowledge; hence the discussion proceeds without discrimination.

It is not to be expected that an author will discuss all subjects equally well; but it is to be regretted that in a work furnishing in other respects so much material of permanent value, this important subject of asphalt pavement should be discussed in such a manner as to be often misleading and generally of but little worth.

While the work will greatly aid the builders of city streets, we believe it will especially commend itself to that larger body of intelligent men who are at this time interested in the improvement of country roads, and to them we commend its careful perusal.

S. F. PECKHAM.

SCIENTIFIC JOURNALS AND ARTICLES.

THE March number of the *Biological Bulletin*, Volume IV., No. 4, contains the following papers:

W. M. WHEELER and J. F. MCCLENDON: 'Dimorphic Queens in an American Ant (*Lasius latipes* Walsh).'

RALPH S. LILLIE: 'Fusion of Blastomeres and Nuclear Division without Cell-division in Solutions of Non-electrolytes.'

CHARLES T. BRUES: 'The Structure and Significance of Vestigial Wings among Insects.'

S. J. HOLMES: 'Death-Feigning in Terrestrial Amphipods.'

EDMUND B. WILSON: 'Notes on the Reversal of Asymmetry in the Regeneration of the Chelae in *Alpheus heterochelis*.'

FLORENCE PEEBLES: 'A Preliminary Note on the Position of the Primitive Streak, and its Relation to the Embryo of the Chick.'

THE principal contents of the *National Geographic Magazine* for March include 'The Canadian Boundary,' by John W. Foster, ex-Secretary of State (a review of the methods by which the line has been adjusted and marked); 'Mountains of Unimak Island, Alaska,' by Ferdinand Westdahl; 'Opening of the Alaskan Territory,' by Harrington Emerson; 'The Forests of Canada,' 'Work in the Far South,' 'The Development of Cuba,' 'Theories of Volcanic Action.' Geographic notes and literature.

SOCIETIES AND ACADEMIES.

GEOLOGICAL SOCIETY OF WASHINGTON.

AT the 139th meeting of the society, held in the assembly hall of the Cosmos Club, Wednesday evening, February 25, 1903, an important discussion on the 'Genetic Classification of Ore Deposits,' begun on January 14, was continued.

Mr. Emmons, in opening the discussion, remarked that the classification of ore deposits on a purely genetic basis had been proposed, not as a practical classification, or one that could at the present day be anything more than tentative, but mainly for the purpose of bringing out the theoretical views to which various workers had arrived as the result of their studies. It seemed, therefore, important to distinguish what was purely speculative from what had actually been demonstrated. Messrs. Weed and Spurr, who had opened the discussion, ascribed an importance to igneous agencies which probably would not be admitted by a large class of workers in the field, especially as applied to certain deposits given as types of one or the other of their classes. This application seemed based on speculation rather than on actual demonstration. The important question seemed to be the capability of igneous magmas to supply