

applied to one of the smaller groups. Mainly on the ground of the exceptional hairiness observable in the Nambutiri Brahmans, he is inclined to accept the brilliant suggestion made by Dr. Rivers from a study of their emigrations preserved by the tribe, that the Todas are comparatively new arrivals in the Nilgiri plateau, and that they are connected in race with the Malabar group of Brahmans. Mr. Thurston records a curious fact which escaped the observation of Dr. Rivers, that their extreme reverence for the herd of sacred buffaloes is shown by the rule that when the animals are driven from one grazing ground to another, the women of the tribe are not permitted to tread upon the track of the holy beasts, but must be lifted over it by the men of the tribe.

In spite of the imperfections in the literary arrangement of his work, to which we have directed attention, Mr. Thurston's volumes constitute a monumental record of varied phases of south Indian tribal life, the traditions, manners, and customs of the people. Though in some respects it may be corrected or supplemented by future research, it will long retain its value as an example of out-of-door investigation, and will remain a veritable mine of information, which will be of value to his fellow-officers in acquiring a knowledge of the people, and a storehouse from which the armchair ethnologist will draw abundant facts of the highest value and interest.

A HISTORY OF BIRDS.¹

OF the series of four volumes to be published under the title of "Animal Life: an Evolutionary Natural History," the editor, Mr. Pycraft, has himself contributed that on birds. The reader will at once be struck by two facts, first, that the subject is treated from the point of view of the evolutionist, as opposed to that of the systematist, and, secondly, that the author is never satisfied until he has inquired into, and, if possible, explained, the various phenomena that meet the eye of the ornithologist. As he tells us in his preface, and as we gather from the excellent introduction by Sir Ray Lankester, which practically summarises the whole work, the study of birds is here presented as one of living organisms, moulded in part by an inherent constitution, and in part by the struggle for existence.

A great array of facts is marshalled in order before us, and presented in attractive fashion, while Mr. Pycraft's well-known skill is particularly evident in the osteology and pterylography; but we must confess that he seems to us somewhat hard upon the "field-naturalist," the results of whose labours he terms "a pitifully small gain to science." It is true that such an one often lacks the training or opportunity necessary for scientific research, but his province is more especially to supply material for the work of his fellows, and must never forget that Darwin and Wallace—not to mention later instances—were essentially field-naturalists.

The volume begins with a brief but sufficient summary of the general structure of birds, and proceeds to consider their phylogeny, their relationship to reptiles, and their development from climbing arboreal forms to those endowed with full powers of flight. The writer's views on this part of the subject are clearly shown by a "genealogical tree," while a woodcut is given of one of the hypothetical primitive types, or pro-aves.

From the ancestral forms of birds we pass on to a sketch of their present distribution and of the generally accepted zoo-geographical regions. Mr. Pycraft accepts the theory that the entire class originated in the northern hemisphere, with the possible exception of the Sphenisci; but the close connection of the latter in his tree of descent with the decidedly northern *Colymbi* seems to run counter to this contention. Environment and its effects next come under dis-



Emperor Penguin brooding its Young. From "A History of Birds."

cussion, with selected examples of adaptation to the surroundings. Here we find the view definitely adopted that a moist atmosphere leads to darker pigmentation and a dry atmosphere to lighter tints, but we are not inclined to follow our author implicitly here without further proof.

Migration is always an interesting subject, and we concur with Mr. Pycraft in paying little attention to very precise "lines of flight"; whether, however, he is right in holding that the trend of migration is due north and south, apart from physical obstructions, is a much more debatable question.

The interrelations of birds and other animals, and their connections with plants, form the subject-matter of three well-written chapters, while an account of the relations between the sexes is not only instructive in itself, but naturally leads us on to the theory of sexual selection. The "displays" of various species, the pugnacity of the males, and so forth, are set forth at due length; but, on the whole, our author minimises

¹ "A History of Birds." By W. P. Pycraft. With an introduction by Sir Ray Lankester, K.C.B., F.R.S. Pp. xxx+458. (London: Methuen and Co., 1910.) Price 10s. 6d. net.

the importance of sexual as opposed to natural selection, and believes that the latter, working on the discontinuous variations which undoubtedly occur, tends to preserve those varieties which finally persist.

Nidification and incubation, eggs and young, and the care of the latter, are next considered, while Mr. Pycraft has much to tell us of what we may learn from the immature bird, whether in the embryonic stage or otherwise, of its precocity or helplessness, its downy condition, its seasonal changes, and its differences from the adult. We notice that he thinks that nest-building is "a product of selection and is instinctive," and that all eggs were perhaps originally white and assumed protective coloration only where necessary.

Artificial varieties and the question of inheritance of acquired characters are treated by the author at some length, while his natural bent towards anatomy enables him to deal fully and successfully with the interesting and important subjects of structural and functional adaptations, and to conclude a work, which we heartily commend to our readers, with a detailed account of various instances of homoplasy.

The numerous illustrations, some of which are new, add much to the value of the book.

REFORMS OF THE CALENDAR.

IN the August number of *Himmel und Erde*, Prof. Förster has a paper on calendar reform, on which, though it is rather discursive, a few words may be of interest. The main point of the paper is to suggest that the International Congress of Chambers of Commerce should take up the question of altering the rule for keeping Easter, which has, from the beginning of the Christian Church, been regulated by luni-solar chronology. That sort of chronology was observed over a large part of Asia, and is by the Jews to the present day, making the year consist of twelve and thirteen months alternately, the months following the moon. But, of course, this does not make the correspondence exact, and other intercalations were necessary. The old Roman calendar was also luni-solar, the months being made to contain twenty-nine and thirty days alternately, which would give only 354 days in a year, so that an additional or intercalary month had to be inserted in alternate years of varying length.

As Dr. Förster remarks, the old Roman calendar had degenerated into a true monster of chronological complication ("zu einem wahren Monstrum von chronologischer Verwirrung"), when it occurred to Julius Cæsar that it would be best to discard the moon altogether as a time-measurement and regulate the calendar by the sun, as had been done in the old Egyptian chronology, a country in which the annual overflow of the Nile was of surpassing importance, and, of course, depended on the solar season.

Cæsar had no occasion to trouble about the days of the week in his calendar. All European nations have followed in the main his calendar, but have had to make a special case of the great Easter festival and the ecclesiastical dates depending on it. But there is no real necessity for falling back upon a Jewish or luni-solar method of reckoning in this respect.

In the years 1872 and 1873 the Rev. J. Newland Smith, of Greenwich, published and distributed two pamphlets on "Eastertide," pointing out that the present complicated rule for keeping Easter was not fixed by any Church regulation; the Council of Nicæa having only decided that it should always be kept on a Sunday. Had Mr. Newland Smith lived (he died in 1880) he hoped that a Bill would have been intro-

duced into Parliament on the question. The proposal in his first pamphlet was that Easter should be kept either on April 9 (that being one probable date of the first Easter day), if that day were a Sunday, or, if not, on the following Sunday; in the second, that it should be always kept on the second Sunday in April, which would include the 9th.

Dr. Förster, in the article before us, makes a similar proposition, which he commends to the International Congress of Chambers of Commerce, that Easter should be kept on the Sunday following April 4, so that it would always fall between the 5th and 11th.

He hopes that other changes may be effected in the calendar, and particularly that the congress may be the means of inducing the Russians and the Greek Church generally to follow the Western usage and replace the Julian by the Gregorian calendar, or some modification of it.

Perhaps we may be allowed the suggestion that the dropping of a leap year each 128th year would be both more convenient and more accurate than the existing Gregorian rule.

W. T. L.

THE DYNAMICS OF FÖHN.¹

MUCH has been written about the dynamics of Föhn, and the general principles involved in it are well understood, yet the processes by which an air current descends and displaces potentially colder air are still somewhat obscure. As in his previous studies of the same subject, Dr. Ficker has followed the method of examining in detail a large number of individual cases. The process is a laborious one, but we agree with the author that it is essential to follow out individual cases if we wish to arrive at a clear understanding of the processes involved. Average results may be very misleading; very probably the condition of things represented by averages never actually occurs.

In all cases examined, Föhn was preceded by typical anticyclonic conditions, with a very stable stratification of the atmosphere. In many instances the valley temperatures were actually lower than those observed simultaneously on the summits. Special attention was given to the time of commencement of Föhn at different stations, which can be accurately determined from thermograph traces. Föhn sets in earliest at the high stations at the head of the valleys, and makes its way gradually to lower levels. Stations at the same altitude experience the onset of Föhn approximately simultaneously, even though they be in different valleys. In a few instances, Föhn made its appearance at Hachlachang, a station near Munich, on the Bavarian plateau, but on all such occasions the outbreak occurred there long after Föhn had established itself in the higher valleys. The suggestion that barometric minima skirting the north-west coast of Europe exert an aspirating action on the lower strata of the atmosphere, and so cause the Föhn, thus falls to the ground.

Local conditions determine the outbreak of Föhn. During the continuance of anticyclonic conditions the valleys become filled with a mass of more or less stagnant air, cold, at any rate in winter, by reason of its contact with the mountain sides, which are chilled by radiation. Above this we find a region of potentially warmer air, and at the junction of the two layers there is often a sudden actual increase of temperature with altitude. The cold air drains away to lower levels. This process is accompanied by a gradual rise of temperature, but the winds associated with it cannot be regarded as true Föhn, because the vertical temperature gradient in them is much less

¹ "Innsbrucker Föhnstudien IV. Weitere Beiträge zur Dynamik der Föhns." By Dr. H. v. Ficker. Pp. 6r. (Wien: Alfred Holder, 1910.)