

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 homoplasia.

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.)

than the adiabatic for dry air. The air removed by drainage is replaced by air from above, which flows down the mountain valleys like a river, often with a tumultuous rush. In this descending current, which is the true Föhn, the temperature gradient is that of the dry adiabatic. The onset of Föhn at a given station occurs when the upper level of the cold air sinks to the level of the station.

In their early stages all Föhns are fed by air which has travelled horizontally to the mountain ridges, and then descended on the northern side. There is no evidence of ascent of air on the southern side of the range during this first, or "anticyclonic," stage. If Föhn persists, a condition of things often develops in which there is heavy rain, and a marked absence of diurnal range of temperature on the south side of the Alps, and simultaneously the temperatures are much lower to the south than to the north of the range. We have then unmistakable evidence of the ascent of air on the south and of its subsequent descent on the north of the range. The conditions which determine whether an "anticyclonic" Föhn shall develop into this second or "stationary" stage need further investigation.

R. G. K. L.

RESPIRATION AT HIGH ALTITUDES.¹

PROF. R. F. FUCHS, with Dr. Deimler, has confirmed the statement of Zuntz and his co-workers and of Durig, that the oxygen use of the human body during work is greatly increased at altitudes above 3000-4000 metres. While on the Colle d'Olen the O₂ use of Fuchs was only 3 per cent. more than at Erlangen; it was 36 per cent. more on the Capana Regina Margherita.

Fuchs and Deimler lived in the hut on the top of Monte Rosa for some weeks, and proved this point conclusively. This increased use of oxygen explains why most tourists are taken with mountain sickness at altitudes above 3000-4000 metres.

The oxygen needs cannot be supplied by the respiratory and circulatory mechanisms in the face of the falling partial pressure of oxygen, and the high oxygen use. Training and acclimatisation economise the oxygen use, increase the oxygen combining power of the blood, the power of the respiratory and circulating mechanisms.

The respiratory quotient sinks to a very low level, e.g. 0.53 after work, while the resting value is only 0.6-0.7 at these high altitudes. To explain this, it is supposed either that glycogen is built out of fat and protein in the body, or that substances are not completely burnt in the body, but are given off as lactic acid in the urine. We know that lactic acid is excreted in the urine after a hard run, when the oxygen used is greater than the supply.

A. Loewy and Franz Müller recently have found that the respiratory quotient is reduced by sea-bathing, e.g. from 0.88 at Berlin to 0.73 at the North Sea. The diet was the same. There is some evidence that the protein metabolism is different both in high altitudes and after the sea-bathing, but further work is required to explain the low quotients. Under the special conditions substances, such as proteins and their derivatives, may be oxidised, which share but little in the combustion process of the body. Fuchs suggests that the new building of hæmoglobin may explain partly the high oxygen use and the low respiratory quotient. It is generally agreed that a stay in high altitudes does increase the hæmoglobin of the body.

LEONARD HILL.

¹ "Physiologische Studien im Hochgebirge: Versuche über den respiratorischen Stoffwechsel im Hochgebirge." By R. F. Fuchs and T. Deimler. Sitzungsberichte der Physikalisch-medizinischen Societät in Erlangen. Band 41, 1909.

NOTES.

THE ninth meeting of the International Meteorological Committee will be held in Berlin on Monday next, September 26, and following days. It will be preceded by meetings of the Commission for Terrestrial Magnetism and Atmospheric Electricity, of which General Rykatcheff is president and Dr. A. Schmidt is secretary, and by meetings of the Magnetic Observations Committee of the International Association of Academies. Of other commissions which originated with the International Meteorological Committee, those concerning scientific aëronautics, the correlation of solar and terrestrial changes, a proposed *Système Mondial*, weather telegraphy, and maritime weather signals have held meetings in the past year, and their reports will come up for consideration at Berlin. Among new proposals to be considered is one by Prof. V. Bjerknes, of Christiania, for the organisation and publication of strictly synchronous meteorological hourly observations of the air at the surface and above at a large number of stations, with the view of studying in detail the precise changes that take place. Since the last meeting of the International Meteorological Committee, at Paris in 1907, many changes have taken place in the personnel of the committee. Death has removed MM. Lancaster, Pernter, and Eliot, while M. Hepites has resigned his directorship of the Roumanian Meteorological Service, and consequently ceases to be a member of the committee. The new members appointed to fill the vacancies are MM. van Everdingen (Holland), Ryder (Denmark), Trabert (Austria), and G. T. Walker (India). Dr. W. N. Shaw, director of the Meteorological Office, is the president of the committee, and Prof. G. Hellmann, director of the Royal Prussian Meteorological Institute, is the secretary.

MR. R. NEWSTEAD, of the University of Liverpool, who, it will be remembered (see NATURE, June 30, p. 530), was dispatched three months ago to Malta by the Liverpool School of Tropical Medicine to investigate the relation of sand-flies to public health, has now returned. It is understood that in the forthcoming report upon the expedition practical measures for dealing with the various disease-carrying insects in the island will be suggested, Mr. Newstead having brought back a considerable amount of material, not only with reference to sand-flies, but also to other carriers of disease.

THE National Fund Airship, which has just been completed, made its first successful flight at Moisson on September 14. It is a little more than a year ago since Mr. Eric Stuart Bruce, the late honorary secretary of the Aëronautical Society of Great Britain, was asked to visit France to make an exhaustive examination into the various types of dirigibles in connection with the national airship, with the result that the Lebaudy type was selected. This latest Lebaudy airship may certainly be said to be the finest semi-rigid dirigible in the world. It is 337 feet 10 inches long, 39 feet 5½ inches in diameter, and has a gas capacity of 353,165.8 cubic feet. It contains three ballonets. The motive power is derived from two four-cylinder Panhard-Levassor petrol motors of 135 horsepower each. The two propellers are made of wood. Mr. Bruce is now acting as honorary secretary to the test committee of the National Fund Airship.

ATTENTION has from time to time been directed to the flower gardens upon vacant land in the neighbourhood of the Strand. The Selborne Society has been investigating a still more interesting building site in Farringdon Street,