

THE IMPORTATION OF BIRDS' PLUMAGE.

TO the *Fortnightly Review* for March Miss I. Gardiner contributes, under the title, "The Fight for the Birds," a timely article apropos of Mr. Hobhouse's Plumage Bill now down for second reading. She gives a history of the rise and progress of the contest against the slaughter and extermination of so many of the most useful and ornate birds of the world for the plumassier trade, which has never been more in evidence than in the past season or two, during which women have "so gaily worn the brand of Cain in the street." Miss Gardiner quotes statistics from brokers' catalogues, mainly of 1911, 1912, 1913, which show that, besides others, 132,000 "ospreys" were killed, 8700 birds of paradise, 22,000 crowned pigeons, 24,000 humming-birds, 23,000 terns, 162,000 kingfishers, 1200 emeus, and 4500 condors. It is significant that, as the author remarks, "reports on the quantities now sold are no longer published in the *Public Ledger* since the House of Lords inquiry."

The outcry against this wholesale slaughter is not confined to the lovers of nature and the humanitarians as such, but is loud from the agriculturists of the Himalayas, of Madras, and other parts of India, of Georgia, Florida, and Carolina, and of Egypt, whose crops are devastated by reason of the scarcity of the birds that heretofore destroyed the insect pests now ruining them. Strong official support has been given by the Zoological Society to Mr. Hobhouse's Bill, and also by the British Ornithologists' Union, although the trade journals claim both societies, as well as quote the names of numerous distinguished scientific men, many of whose names were authorised under the impression that they were supporting the principle of the Bill—as in favour, not of the Bill, but as supporters of the Committee for the Economic Preservation of Birds. Unfortunately, the Zoological Society has been made to appear to the general public to support the Economic Committee—to which it is absolutely hostile—through the secretary of the society having accepted, in his private capacity, the chairmanship of the committee. The corresponding Economic Committee in Paris, as recorded recently in *NATURE* (January 29, p. 617), was entirely defeated on its very strenuous attempts to check the growing force of opinion in France in favour of the protection of birds, fostered by the Acclimatisation Society.

Miss Gardiner's article should be widely studied by all who desire to know the rights and wrongs of the plumage traffic. In a letter "On the Need for Protection of Rare Birds," in the *Times* for March 3, the Hon. Charles Rothschild says he is impelled to write "as there is a danger of the [Plumage (Prohibition)] Bill being defeated through the efforts of those opposed to the measure, who have formed themselves into . . . the Committee for the Economic Preservation of Birds." His observations fully corroborate what Miss Gardiner has stated about the objects of this committee in the *Fortnightly Review*. "One thing is certain," as Mr. Rothschild remarks, "that many of the most beautiful birds have never been in greater need of protection than at the present time. In the *Times* of March 6 Mr. C. F. Downham, replying to Mr. Rothschild, trails once more the red-herring of the "dead" egret feathers across the question. It has been abundantly proved that the plumes offered as "dead" were wrongly so described to quieten public opinion; and if, indeed, any "dead" feathers now come to the market, they are brought with the same object, and for the reason that the supply from slaughtered birds has decreased below the demand, not "because the area of protection is increasing," but because the heronries themselves have been so

depopulated. It is amusing to read Mr. Downham's statement that "the nuptial plumes of the egret are borne by the birds long after the nesting time, and that the birds carry their feathers for seven or eight months of the year."

In the March issue of *Pearson's Magazine* Mr. Hesketh-Pritchard describes the almost incredible cruelties perpetrated by the professional plume-hunters, the sworn testimony of one of whom he quotes, which is directly contradictory of the plume-traders' reiterated declarations that the "egrets" are moulted feathers. The *Spectator* of March 7 has also a powerful article on the need for the Plumage Bill, from which the following sentences are extracted:—" . . . the activities of the [economic] committee appear at present to be centred hardly so much on the protection of birds which are being harassed, as upon definite opposition to the Bill which prohibits the importation of their plumage. . . . The plumage of all birds is at its brightest in the breeding season, and it is at this season, therefore, that the bird is killed. No 'economic preservation' will alter that fact. The plain issue, in short, is . . . whether traffic in feathers which admittedly involves cruelty and which leads inevitably towards the extinction of species shall be permitted at all. So far as Great Britain is concerned, we hope that a Plumage Act will be the answer."

A public meeting will be held at Caxton Hall, on Thursday, March 19, at 5.30, under the patronage of the Royal Society for the Protection of Birds, the Zoological Society, the Avicultural Society, the British Ornithologists' Union, the Society for the Promotion of Nature Reserves, the Society for the Preservation of the Wild Fauna of the Empire, and other bodies, in support of the Plumage Bill. When the Bill is passed it will be illegal to import the feathers or skins except for scientific purposes, for which purpose a licence will be obtainable from the Board of Trade. It is confidently believed that such legislation will have far-reaching effects towards the preservation of rare and beautiful wild birds. The trade in ostrich feathers is specially exempted from the provisions of the Bill. Tickets (free) for the meeting may be obtained through the secretaries of the patron societies, or from the hon sec., Plumage Meeting, 34 Denison House, Westminster.

THE VITAMINES OF FOOD.¹

FLEURENT, in his "Le pain de Froment," shows that the grain of wheat consists, by weight, of the protective coat (15.6 per cent.), the embryo or germ of millers (1.4 per cent.), and the white flour (83 per cent.). The coat includes, in addition to the pericarp and testa, the aleurone layer of the endosperm, the remainder of which forms white flour. The bran of the miller, as removed by the metallic roller, includes the aleurone layer, which is not only a starchless layer, rich in fats, but contains the newly discovered bodies to which C. Funk has given the name of vitamines, and of which the first detailed authoritative account has appeared this year ("Die Vitamine," von Casimir Funk, J. F. Bergman, Wiesbaden, 1914).

A discussion of their chemical nature would be out of place now, and must be left to organic chemists. It may be mentioned, however, that they do not contain phosphorus, they are not fatty bodies, and are distinct from lipoids. They are nitrogenous and of highly complex structure (e.g. the formula of one is $C_{26}H_{20}O_8N_4$); they are indispensable for

¹ Summary of a lecture entitled a "Grain of Wheat," delivered in the National Museum, Dublin, on February 24, '14 by Prof. T. Johnson.

life, and no diet is complete without them. If the brain, "one of the three legs of the tripod of life," is starved by a vitamineless diet troubles of all kinds—called by Funk *deficiency diseases*—arise, and these may end in death. The muscles dwindle away, the nerves degenerate, and heart and bone troubles result. Their absence is a predisposing cause of tuberculosis. Vitamines are found in plants, and especially in their seeds. So far as is known at present, animals are incapable of making them. Animals, however, obtain them by feeding on plants. Thus vitamines occur normally in meat, fresh milk, and yolk of egg. They are soluble in water, and insoluble, mostly, in ether. They are thermostable, and are destroyed by exposure for 10–20 minutes to a temperature of 120°–130° C., as well as by extreme dryness. Thus cattle may, following on a long drought, suffer from a vitamineless fodder.

Funk regards vitamines as the mother-substance of ferments and hormones, and of vital importance to the thyroid and other ductless glands. It is thus evident that the diet standards of the text-books must be revised in the light of their discovery, which throws a flood of light on the milk and other food problems. White flours and corn flours are deficient foods because the vitamines have been removed in the milling process.

Wherever any cereal, robbed of its aleurone or vitamine layer, forms the chief food of a people, there a deficiency disease appears. Rice is eaten by more people than any other grain, in the tropical regions of both hemispheres. The marked increase of beriberi caused by eating *polished* rice, claiming thousands of victims yearly in Japan, etc., coincides with the replacement of the primitive whole-grain stone-milling by the modern steel roller. The United States Government has already made the polishing of rice in the Philippines illegal. Indian corn (*Zea mais*) is largely eaten in north Italy, the Balkan provinces, the southern part of the United States, Brazil, etc. In all these countries pellagra, which affects the skin, digestive organs, and mental powers, is prevalent. The disease could be stamped out by adding to the diet potatoes, one of the cheapest and most practical sources of vitamines. Though the tax of 32s. 6d. a ton on potatoes has been removed, the U.S. Government has at the same time closed its ports to European potatoes, as a precaution against the introduction of potato diseases, such as Spongospora, though pellagra is on the increase, and American potatoes are becoming dearer.

Rickets, scurvy, osteomalazia, etc., are also deficiency diseases caused by the use, as the main articles of diet, of such vitamineless foods as sterilised milk, condensed milk, cornflours, starch, and sugar. The mixed diet of most people protects them from deficiency diseases.

Vitaminous foods are fresh milk and (though less rich in them) pasteurised milk, whole grains, potatoes, carrots, and other fresh vegetables, lime and other fruit juices, beans, peas, lentils, and the like, meat, beef-tea, barley-water, yeast, and apparently cod liver oil. The discovery of vitamines leaves the vexed question of the relative values of white bread, standard bread, etc., where it was, as the heat of the oven, far above that of the autoclave in milk sterilisation, probably destroys the vitamines of the wholemeal bread.

Phaseolus mungo. L. (*P. radiatus*, L.), added to polished rice effectively supplies the removed vitamines, prevents beri-beri, and has long been regarded by the Chinese as a delicacy in the form of vermicelli. A yeast extract is already available for a similar purpose in this climate.

ATMOSPHERIC REFRACTION AND GEODETIC MEASUREMENTS.¹

AMONGST the many perplexing problems with which geographical surveyors have to deal those which concern the determination of altitude are not the least. For purposes of practical ability, such as the levelling of roads or the laying out of contours and gradients where differential altitude is comparatively small and progressive, existing methods are quite sufficiently scientific and accurate. It is in the determination of the relative altitudes of large geographical features, where angular measurements become necessary, that there arises a series of complications due to variations in the amount and effect of refraction, or in that of the plumb-line deflection, which have been by no means exhaustively investigated, and which introduce errors of an appreciable quantity. These errors are seldom of large practical importance, so that an investigation into their origin and the scientific methods of their dispersion is more or less matter of academic interest to that limited public which concerns itself with mountain altitudes and is generally content to accept the reading of a cheap aneroid as sufficient proof of the correctness of a value determined by triangulation.

By the scientific geodesist, however, Mr. Hunter's investigations will be warmly appreciated. The book before us is No. 14 of the Professional Papers of the Survey of India, and it contains a careful analysis of the chief sources of error which beset the ordinary estimates of the amount and effect of terrestrial refraction. The error due to refraction is usually disposed of by the assumption that the angle of refraction bears a constant ratio to the angle contained by the ray of observation at the centre of the earth. When reciprocal observations can be taken (*i.e.* from A to B, and from B to A) this ratio can be determined, and it is then recorded as the "coefficient of refraction," and is applied to other observations which, not being reciprocal, require to be corrected for the effect of refraction. This method Mr. Hunter calls a "makeshift," and it is with the object of putting the consideration of "angular measurements affected by terrestrial refraction on a more accurate and scientific basis," that he has deduced formulæ from his investigation which, in the concrete form of tabulated corrections, may assist in dispersing the errors arising from variations in the density, temperature, and atmospheric pressure of the air between the station of observation and the point observed. The only assumption which he makes is the natural one that "layers of equal density in the air are concentric with the (circular) section of the earth in the azimuth of the ray," an assumption which includes that of thermal equilibrium. The formulæ derived in chap. i. show that refraction depends very largely on the rate at which temperature changes with the height, and with the change of this rate, as well as on the differential height to which the ray extends. Mr. Hunter confirms the accepted rule that refraction is least in the middle hours of the day, but he further regards its variations as seasonal, *i.e.* it is least in the springtime of the year.

But when all is said and done, it is the errors arising from the deflection of the plumb-line (not always ascertainable at the point of observation), and the possible variation in the actual height of the point observed (common enough in the case of snow-capped peaks), which chiefly affect the accuracy of angular determinations of altitude, and it is probably to these rather than to the unequal conditions affecting the

¹ "Formulæ for Atmospheric Refraction and their Application to Terrestrial Refraction and Geodesy." By J. de Graaff Hunter.