

The fringes appear to be due to the interference between two portions of light arising out of the single beam incident on the grating, one of them being reflected at the silvered surface and then diffracted out by the grating element which it meets, and the other being diffracted into the air space by the same grating element and then reflected out by the silvered surface. The path difference is equal to

$$2t(\cos X - \cos \phi)$$

where ϕ and X are the angles of incidence and emergence respectively, and t the thickness of the air film. Therefore the condition for interference is

$$2t(\cos X - \cos \phi) = \frac{2K+1}{2}\lambda \dots (1)$$

where K is an integer.

But since we are using the grating, ϕ and X are connected by the relation

$$d(\sin \phi - \sin X) = n\lambda \dots (2)$$

where d is the grating interval and n the order of the spectrum.

Hence, dividing (1) by (2), we have

$$\tan \frac{\phi+X}{2} = \frac{(2K+1)d}{4tn}$$

In this equation $(\phi+X)$ is the angle which the direction of any particular dark fringe makes with the incident light, *i.e.* with the axis of the collimator. Since $(\phi+X)$ is determined once for all independent of the position of the grating, the absolute fixity of the fringes is accounted for. A detailed paper on this subject was laid before the session of the Indian Science Congress held at Bangalore in January, 1917.

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S. India, February 10.

Mountain Sickness.

THE reference in the Notes columns of NATURE of January 25 (p. 415) to the physical failure experienced in mountain-climbing at high altitudes sent me to the very instructive (and suggestive) article by Dr. A. M. Kellas in the *Geographical Journal*. And the great interest now attached to one of the inevitable problems of the immediate future gave me to think that a few supplementary notes might be of sufficient interest for publication. The "mountain sickness" which forms the association that specially interests the physiologist and the physician was impressively brought under the notice of the latter in the "fall" of the fifteenth century; when the gold-thirst of the ruthless Spanish invader of the western Eldorado made him familiar with its symptoms directly after reaching the very elevated backbone of the southern section of the New World. The oldest special description that appeared in print would seem to have been that of Da Costa; and the very human appetite for novelty proceeded very soon to make the "*mal de montagnes*" a phrase-name as familiar to Western Europe as that of the *mal français*—so very unhappily—rapidly came to be. The syndrome was referred to in the various linguistic territories bordering the giant Cordilleras as: *Soroche*, *mareo des Cordilleras*, *asthma des montagnes*, etc. And the native prophylactic, on the colossal slopes and towering cliffs of the Cordilleras of Peru, was slow and continuous mastication of prepared pellets of the dried juices of *Erythroxylon coca*—the original version of American "gum-chewing." The phenomena came in time to receive definite scientific discussion, notably at the hands of

Bouguier ("Voyage en Peru") in 1745, and Condamine (of Peruvian bark fame) in 1751.

As world-wide scientific mountaineering developed—along lines of modern evolution—a number of French and German observers came to depict in turn their personal experiences of the symptom-group: Saussure, Clissold, Barry, Rohrdoff, Zumstein, Lepileur, Martins, and Bravais—according to their several personal experiences on Mont Blanc; Humboldt, Boussingault, and Hall—on the upper reaches of Chimborazo. As might be readily anticipated, in a personal experience in which individual constitution and previous training count for so much, we are told by the illustrious Humboldt that: "Ces phénomènes sont très-dissémbles suivant l'âge, la constitution, la finesse de la peau, les efforts antérieurs, les forces musculaires," etc. It very obviously corresponds in great, though not exclusive, measure to the "incommodités" of the balloon ascent of Biot and Gay-Lussac, on "le 6 fructidor, an XII" (August 24, 1804)—greatly exaggerated, of course, and developing at a lower altitude, from the very laborious muscular exertion of mountain-climbing. The latter rivals, as a factor in physiological derangement, the suddenness of change of environment in a balloon ascent, which bars off all chance of the gradual adaptation which would be so very necessary for functional adjustment.

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BORNEO AND ITS INHABITANTS.¹

AS explained in the author's unfinished introduction, this book is a somewhat disconnected account of the natural history of Borneo, compiled from notes while he was in charge of the Rajah of Sarawak's museum at Kuching.

The first chapter deals with the mammals, and, as might be expected, considerable space is devoted to the orang-outang, or, as the author prefers to call it, the "Maia," this being its correct Malay name. It is satisfactory to learn that this interesting representative of the human family is still abundant, though local, in Sarawak. Though the fauna of Borneo is lacking in many of the larger mammals that appeal to the sportsman, it has at least its full share of remarkable forms among the smaller species. Many interesting details are given of that extraordinary little lemur, the Tarsier, *Tarsius spectrum*, and of the so-called flying lemur, *Galeopithecus volans*, that puzzle for systematists which has now the distinction of an Order to itself. The remarkable colour relationships between the squirrels of the island and certain unpalatable tree-shrews of the genus *Tupaia* are discussed at length. The relations of palm civets with coffee are at first sight far from obvious, but those of our readers who obtain their coffee from Borneo and are curious as to the previous history of the best quality berries should consult p. 33! It is of peculiar interest to find the mouse-deer taking the place in the native folk-lore of "Brer Rabbit," the latter itself being a direct descendant of the hare which always figures as the cunning hero in equatorial Africa.

The second, third, and fourth chapters are de-

¹ "A Naturalist in Borneo." By the late Robert W. C. Shelford. Edited, with a Biographical Introduction, by Prof. E. B. Poulton. Pp. xxvii+337+xxxii plates. (London: T. Fisher Unwin, Ltd., 1916.) Price 15s. net.