

lateral occipital protuberances, 140; height from basion to top of occipital crest, 137; least breadth maxillary zygomatic process, 70; breadth across sockets of canines, 70; breadth across tips of canines, 290; length of palate, 270; least palatal breadth, between  $m^2$ , 40; basal diameter of canine, 40; lower jaw, length, bone only, 325; breadth across symphysis at base of canines, 130; least breadth across diastema, 105; height at diastema, 55; tip to tip of canines, 225; basal diameter, outer face of canines, 22, inner face, 24, posterior face, 16; horizontal length of  $p^1$ , 15, of  $m^1$ , 19, of  $m^2$ , 26.5, of  $m^3$ , 45.

Dental formula:  $i. \frac{1}{2}c. \frac{1}{2}p. m. \frac{3}{4}m. \frac{3}{4}$ .

As I have said, this cranium is massive, the bones rugose on their outer surface, the nasals mostly fused together, and the frontal depression strongly marked.

HENRY H. GIGLIOLI.

Florence, Royal Zoological Museum, February 17.

### Gambling and Mathematics.

YOUR reviewer "G. H. B." suggested in NATURE of January 31 (p. 318) that every schoolboy should know something about chance and chance in order that he may not develop into a gambler. I agree with him. But one may suspect that gamblers are either those who have not had the advantages of a mathematical education or those who belong to "slow dull" grade and are unable to appreciate those advantages; and yet one may be quite unable to prove that this is really the case.

Can any of your correspondents bring forward evidence to show that mathematicians gamble less than other men, or that gamblers really are mathematically defective?

The matter is important as indicating the point at which the efforts of an anti-gambling league should be most usefully applied. Is it in the intelligent teaching of mathematics? And are we right in distrusting the methods of exhortation when the methods of algebra will suffice?

Bootham School, York.

HUGH RICHARDSON.

THE subject of Mr. Richardson's letter raises a wide field of discussion, of which the few words in my notice convey a very imperfect idea. I should like to see the matter discussed in a suitable quarter when such can be found, but I believe it is a question for psychologists as well as mathematicians.

I take it that the ordinary gambler speculates in order to win, and that the prospect of winning is the incentive which does the greatest harm.

When a man speculates by staking, say, 1*l.* on the chance of winning 10*l.*, the notion of winning 10*l.* makes a big impression on his mind, and means something more real to him than the idea that the odds are 200 to 1 against him (say). He forms a clear mental picture of the prize, and the odds do not present the same picture to his mind. Consequently, he exaggerates his prospects. What I meant to imply is that schoolboys ought to learn to calculate probabilities, so that when they grow up they should think as clearly and form as strong mental pictures of the odds against them in a game of chance as they do of the value of the prizes, and that they should learn to calculate expectations and to think of these rather than of the prizes.

But when Mr. Richardson uses the word "algebra" he implies something different from what I mean, which is more correctly described as arithmetic. What I should like would be to see a chapter on probabilities treated in an elementary course of arithmetic, and boys familiarised with the idea of probability calculations, the representation of probabilities by fractions, and the calculation of expectations, without any algebra being put in to puzzle them. Quite simple questions, in fact. I will not say that everyone who had studied probabilities would not indulge in a game of chance now and then, but they would go in with the expectation of losing rather than winning, and they would know it was no use to try to make up a loss by making false estimates of the probability of the luck turning. If nobody gambled except for the amusement, and if everybody before doing so made a calculation beforehand as to how much they were prepared to pay for that amusement, realising that their expectation in every case was a

loss (if playing against a bank), the worst evil of gambling would be eliminated. The only difficulty would be the psychological one of preventing a man from being carried away by his excitement.

What people should know is that to speculate against a bank or syndicate is a bad investment, and that even to speculate where all profits are distributed between players is not a paying investment, but is really also a bad investment even if the expectation equals the man's stake, on the ground that a bird in the hand is worth two in the bush. The loss of the bird in the hand means a definite loss of income; the expectation cannot be regarded as income.

G. H. B.

### Some New Methods in Meteorology.

SINCE the appearance in NATURE of December 20, 1906, of my review of Prof. Bigelow's "Studies" under the above title, I have had some correspondence with Prof. Willis L. Moore, chief of the U.S. Weather Bureau. I am glad, with Prof. Willis Moore's sanction, to quote part of his letters to me, which will, I hope, allay any apprehensions which may have been aroused as to the methods of research likely to be adopted at the new Mount Weather Observatory. Prof. Moore writes:—"... Since June, 1905, Prof. William J. Humphreys, of Johns Hopkins University, and formerly Professor of Physics at the University of Virginia, has been Supervising Director at our institution at Mt. Weather. We wish to ascertain facts by experimentation, rather than to exploit theories, however beautiful they may be. We consider Prof. Bigelow's numerous papers as expressing simply his own views. . . . Neither myself nor any member of my staff desires to be considered responsible for any theories that may be advanced in the publications of the Bureau, except he be the author."

Prof. Willis Moore's explanation, and his recognition of experiment as the necessary and ultimate criterion, justify the expectation that, backed as it is by the resources of the U.S. Weather Bureau, the new research observatory at Mount Weather will prove a most useful institution for the advancement of scientific meteorology.

CHARLES CHREE.

### PAGAN RACES OF THE MALAY PENINSULA.<sup>1</sup>

THE scope of this work, which runs to nearly 1600 pages, is defined in the preface, where it is stated to be "essentially a compilation from many sources," but differing from most books of that kind, "first, in being based to a very large extent on materials hitherto unpublished, and accessible only through private channels of information, and secondly in having been constructed with special knowledge of the subject and in a critical spirit."

Accurate though these statements be, they offer but slight indication of how thoroughly the book is inspired with the experience and critical knowledge of the authors, and how well the subjects dealt with have been unified in their hands, a task the difficulty of which may be judged in part by a consideration of the unsatisfactory nature of much that has been written as well as by the length of the bibliography which follows the preface. The authors explain that the several parts of the book dealing with the physical and cultural characteristics of the tribes had been originally arranged under subject headings, and that the book was then re-written upon "a phylogenetic system, so as to throw into relief the differences which separate one race from another," a plan which no one will doubt has added immensely to the clarity of the work. Although the title-page bears the name of both authors, the greater part of the work has been written by Mr. Skeat, Mr. Blagden

<sup>1</sup> "Pagan Races of the Malay Peninsula." By W. W. Skeat and C. O. Blagden. Vol. i., pp. xi+724; vol. ii., pp. xi+855. (London: Macmillan and Co., Ltd., 1906.) Price 42s. net.