

On the Extinct Emeu of the Small Islands off the South Coast of Australia and probably Tasmania.

SOME of my colleagues in Australia, as I gather from "Notes" in NATURE (vol. lxxv., pp. 228, 467), have lately been at work on the identification of the small emeu of the islands in Bass Strait and Tasmania, now extinct. Prof. Baldwin Spencer, of Melbourne, having examined the bones of the emeu which once lived on King Island and found them smaller than those of *Dromaeus ater* of Kangaroo Island, has felt justified in proposing a name for that bird, and has called it *D. minor*. Colonel Legge, an old colonist, has also been working on the King Island emeu, and proposed for it a name, which, however, he withdrew in a postscript to his paper in favour of Prof. Spencer's one already published. From memory, having seen a pair in his boyhood, Colonel Legge considers the Tasmanian emeu a distinct *small* species.

Now I believe that the question of the emeus of small size which about a century ago yet lived in Tasmania and on the small islands off the south coast of Australia can only be settled by a careful comparison of their bones, and then, and then only, shall we know whether one or more species lived on those islands. I do not know of the existence in museums of specimens, either mounted skins or skeletons, of well authenticated Tasmanian emeus, but we possess two authentic skeletons and two mounted specimens of *Dromaeus ater* (Peron), which in the first years of last century was abundant on Kangaroo Island; two of these four specimens are in Paris, one is in Florence, and one in Liverpool. Mine is a skeleton, and is one of the three brought alive to France by Peron in 1803 from l'Île Decrès (Kangaroo Island) (NATURE, vol. lxii., p. 102; *Ibis*, 1901, p. 1); the Liverpool specimen is, I think, not located; it is undoubtedly *D. ater*, but might hail from King Island or even from Tasmania; it may be the lost "lesser emea" of the Bullock Museum, dispersed in 1819.

I may now add that last summer my friend Mr. Alexander Morton, director of the Tasmanian Museum at Hobart, sent me some bones of the small emeu which he had collected on King Island, in Bass Strait, asking me to compare them with the corresponding bones of the skeleton of *D. ater* in this museum. I did so at once, aided by Prof. E. Regalia, a high authority on ornithic osteology; the result of our careful comparison was that, barring some slight differences of purely individual value, the remains of the three specimens from King Island examined were *absolutely identical* with the corresponding bones of Peron's specimen from Kangaroo Island. I therefore wrote to Mr. Morton (from whom I have not heard since) that I had not the slightest doubt that *D. ater* (Peron) once lived on King Island, and unless new evidence should show the contrary, I am much inclined to favour the hypothesis that the same diminutive emeu once lived in Tasmania.

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Royal Zoological Museum, Florence, March 29.

Mean or Median.

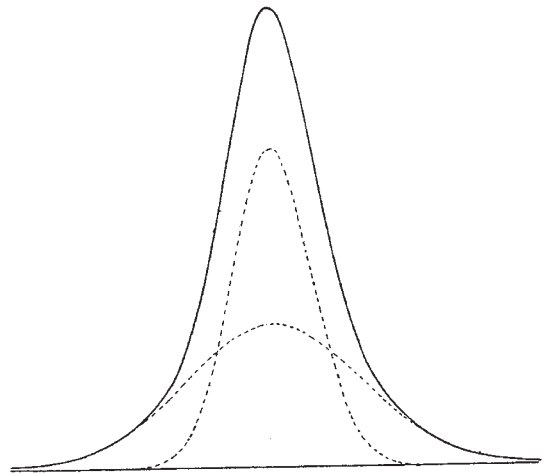
THE two applications of the *median*, suggested in Mr. Galton's letter (NATURE, February 28) and his article (March 7) respectively, seem to me to be somewhat distinct.

In the case of a jury or committee voting as to a sum of money to be given, there is no question of truth, but only of expediency. If any amount be proposed and put to the vote, the proposition will (by the ordinary way of voting) be defeated so long as that amount is above the median; the process of voting tends, therefore, to give an amount *not greater than* the median. Mr. Galton's suggested procedure is in this case, it seems to me, quite correct, and a saving of time would be effected if the problem were consciously approached from his standpoint.

The case of averaging a series of estimates with the view of arriving at objective truth appears to be on a different footing. If there is a considerable sprinkling of fools or knaves amongst the estimators, or of persons with a tendency to bias—as the buyers and sellers might be in judging the weight of cattle, according to the suggestion of Mr. Hooker—the question as to choice of means is one that is difficult to answer. The important question is,

in fact, not the "probable error," but the probable *bias*, for the whole frequency distribution may centre round an entirely erroneous value. If, on the other hand, the observers are honest and unbiassed, the choice of average turns on the form of the frequency distribution; we require that average which is (1) least erroneous, as a rule, (2) least subject to fluctuations of sampling—two conditions which may very well conflict. As regards (1), psychologists, following Fechner, suggest the geometric mean, I believe, as the best. But the distribution of guesses given by Mr. Galton does not appear to follow the law of the geometric mean; if it did, the median should be less, not greater, than the arithmetic mean. Further, so far as one can judge, the geometric mean would give a value as much too low as the median is too high. Looking at the distributions in Prof. Pearson's memoir on errors of judgment (Phil. Trans., 1902), there seems very little to choose between the mean, the median, and the mode; sometimes one is the best and sometimes another.

As regards (2), the probable error of the median has been discussed on several occasions by Prof. Edgeworth (*Phil. Mag.*, 1886, 1887; *Camb. Phil. Trans.*, xiv., 1885). The value is $0.674 \dots /2h\sqrt{n}$, where h is the true ordinate of the frequency distribution at the median, *i.e.* $1/\sqrt{2\pi}\sigma$ for the normal curve. For the normal distribution, therefore, the probable error of the median is greater than that of the mean in the ratio of 1.25:1, approxi-



mately. For a flatter topped curve with more curtate tails the ratio of probable errors is greater than 1.25:1, and accordingly for all such distributions the arithmetic mean is the better form of average. But for a curve with a high central peak and long tails, the probable error of the median may be less than that of the mean, and it will be the more stable form of average. As an illustration, Prof. Edgeworth has taken the case of a distribution compounded of two superposed normal curves with the same means and numbers of observations; if the standard deviation of the one is to that of the other in ratio greater than 2.236:1, the median has a lower probable error than the mean. The figure shows the critical distribution for which the probable errors of mean and median are the same.

In the absence of definite knowledge as to the frequency distribution of estimates in any specific case, it does not seem to me that any confident judgment as to choice of means can be given.

G. UDNV YULE.

March 26.

Golden Carp attacked by a Toad.

THE following account of a toad attacking a golden carp may be of interest to some of your readers from its bearing on an ancient belief that frogs and toads are at enmity with carp, and kill them by destroying their eyes. Izaak Walton in the "Compleat Angler" refers to this belief,