

agree to the author's statement that the "Ram's head is clearly modelled". Except for what the author calls "the curling horns", I fail to find anything to warrant the conclusion that the object is a clear model of a ram's head. On the other hand, the slightly curving and tapering facial portion and the omission of the ears (especially when the artist has taken pains to mark the position of the comparatively smaller eyes and the nasal holes) seem to suggest that the maker intended this removable head portion of the sarcophagus to represent a hovering bird (perhaps a Vulture) and not the head of a ram. If it represents a hovering bird, then the "curling horns" may be taken to represent a pair of sturdy wings. Again this part of the sarcophagus is so small and suits so ill the rest of it from the point of view of proportion, that it raises in my mind the doubt, whether the person who made the object ever meant this sarcophagus to represent a ram. The presence of the six legs adds colour to this doubt.

Composite objects are not uncommon in pre-historic archæology. It seems to me to be more reasonable to call this sarcophagus a composite object than to christen it a "ram sarcophagus". It may be a fantastic representation of some mythological figure associated with death that loomed large in the minds of those pastoral people. One must remember that the big, the unnatural, the grotesque and the unknown appealed to the primitive mind more than anything else and the primitive man made attempts whenever he had opportunities to represent his imaginary pictures of these in his handicrafts.

Further on in the article the author makes mention that this sarcophagus is the second "funerary vessel in animal form known from South India". This is incorrect. The Superintendent of Archæology, Cochin State, in his annual report of the Archæological Department of the Cochin State for the year 1109 M. E. (1933-34 A.D.) mentions that a sarcophagus which has "the appearance of a cow in a lying posture" was discovered at Kattakampal in the year 1933-1934. This report was published a few months before or very shortly after this supposed "Ram Sarcophagus" was unearthed.

K. GOVINDA MENON.

Madras,  
February 5, 1936.

#### The Mineral Bababudanite—An Explanation.

IN my reply to Mr. M. B. Ramachandra Rao's letter entitled "The Kaldurga Conglomerates and the Iron Ore Series of the Bababudans, Kadur District, Mysore," published in this *Journal* (Dec. 1935), I am afraid I have not made myself quite clear in my remarks regarding the origin of the mineral bababudanite when I said "my colleague, M. R. Srinivasa Rao, and I were the first to point out that the mineral was developed as a result of thermal metamorphism." The intention at the time of writing this was not what this statement would literally imply, for I was aware that Jayaram had suggested the secondary nature of bababudanite and I have myself referred to it in one of my papers.<sup>1</sup> What was intended to be claimed was, that the exact nature of the rocks involved in the process of metamorphism giving rise to bababudanite, was elucidated for the first time in the course of my work.

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Bangalore,  
February 5, 1936.

<sup>1</sup> C. S. Pichamuthu, *Curr. Sci.*, 1935, 3, 608.

#### Mathematics and the Sciences.

THE review of *Descriptive Mathematics* on page 556 of the January number of *Current Science* demands comment. The book reviewed is *not* a companion volume to *Graphs and Statistics*, though a contrast to it. Nor is it a book for "statisticians whose background of mathematics is negligible"; if it were so, why the title *Descriptive Mathematics*? Your reviewer seems to have got nowhere near the standpoint of the book. One difficulty seems to be that the unique situation we enjoy here in Bombay is not appreciated—it is possible for us to act in making striking departures from the ordinary courses in elementary College mathematics without taking the whole body of teachers with us immediately. *Descriptive Mathematics* is an endeavour to define such a departure, not to popularise it; but the standards your reviewer appears to have applied in valuing the book are quite conventional. He merely thinks of students as they are, and not as they might be were they successfully led through such a course as is proposed. He seems, so far as his ideas are clear, to differ in no essential respect from

those who were expected, according to the preface of the book, to look askance at certain methods used and to say that the thing proposed could not be done.

But the plain fact is that something needs to be done. Not a few specialists in economics and in the biological sciences feel the necessity of stopping to prepare courses in elementary statistics, etc., for the benefit of their colleagues in order to deal more effectively with the problems of their own researches. These courses, applicable in subjects ranging from textiles to physiology, have a very great deal in common. Again, inept use, or the avoidance, of elementary mathematics in the physical sciences could be abundantly illustrated. These are, I think, but indications of a misdirection in the general outlook on mathematics; and certainly the ordinary courses in mathematics meet such needs not even in an indirect way. We cannot long continue to ignore this defect in our educational practice, and a first task must be to discuss the lines along which we should move away from the present mathematical courses. In *Descriptive Mathematics* is a definite proposal to this end for first year students only, not for the second (Intermediate) year; but your reviewer can see nothing new in it, and merely judges it from a conservative standpoint. (To take one simple instance: I should like to know if there be anywhere else an examination of the principles of slide rules comparable with that on page 97.) When we have achieved a reasonable measure of agreement as to what aspects of elementary mathematics should be taught, there will be no lack of endeavours to write books suited to examination purposes. But that is not the criterion to apply at this stage.

JOHN MACLEAN.

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February 2, 1936.

I HAVE perused Prof. Maclean's comment. Prof. Maclean is a distinguished educationist of Bombay and we have high respect for his services to the cause of education. But so far as his present book is concerned, I cannot help expressing my frank and honest opinion without any reservations. I shall not worry myself about this charge of conservatism on my part, but I shall dwell with emphasis on one point only:

The average man has a general dislike for or difficulty to follow the theory of mathe-

matics. It must be the endeavour of every mathematics teacher of the elementary stage to present the subject with as much simplicity as possible, confining in the earlier stages only to the *intrinsic beauty* of the subject, omitting all details and complications to a later stage. To most people, even to many mathematicians themselves, numerical work and heavy calculations are disgusting. From the boy at school who works on vulgar fractions and decimals, to the average public man, heavy arithmetic is never taken as matter of love. This is a general human weakness, and not all the slide rules in the world can remedy this to any remarkable extent. If then heavy numerical work is taken as a necessary adjunct to the elementary principles and methods of mathematics, and the result of this fusion is called *Descriptive Mathematics*, it is my frank opinion that most people would bid good-bye to this kind of mathematics. Experimental Scientists, and research workers in Social Sciences require and will automatically cultivate the required speed and accuracy in numerical work, when they settle down at their work, but to inflict this kind of work on a poor First Year Intermediate student is horrible!

I remember our learned Editor of the *Current Science*, in the course of a speech somewhere saying to the following effect: To the Physicist, everything in this world will appear as Physics and Chemistry, to the Biologist, everything will appear as Biology, etc. Likewise, shall I say that a Statistician cannot *describe* simple elementary principles of mathematics without asking his boys

(1) to use the slide rule and verify

$$\frac{2}{\pi} = \frac{\sqrt{2}}{2} \frac{\sqrt{(2+\sqrt{2})}}{2} \frac{\sqrt{\{2+\sqrt{(2+\sqrt{2})}\}}}{2}$$

(2) to draw the curve  $y = 1320x^{-0.0234}$

(3) to solve  $10000 (\sin 3x + 2\frac{1}{2} \cos 2x) = x^2 - 300x + 9000 ?$

These are a few specimens from the book.

I have no personal dislike for statistics and I have some little pretensions for the subject myself; I can also boast myself to be a moderately good computer. But there is a difference between having a knack for this work or cultivating it as one's needs arise, and gulping this down on a poor Intermediate student.

One can see in Prof. Maclean's book in many places the hand of an experienced and able exponent of the subject, but in my