Grouping, which is commonly used to save labor, in itself introduces some error in the result. In the sample above, the loss in the estimation of the standard deviation is 2.28 per cent.; the loss in the estimation of the mean is half as great. This in itself would seem to be good reason not to express the constants to four decimal places.

L. H. C. Tippett in a similar example in "The Methods of Statistics" (pp. 39–41) expresses the mean of a series of 1,078 heights, given to the nearest inch, as 67.6976 inches, with a standard error of 0.082. This is followed by the startling statement that "the constants have been calculated *correct*[1] to several decimal places."

Occasionally some one suggests a rule for significant figures in statistics. Kelley[2] suggested the criterion: "Keep to the place indicated by the first figure of $\frac{1}{2}$ the probable error."

Scarborough in "Numerical Mathematical Analysis" (p. 11) states that the average of 10 or more numbers which are given to n significant figures is usually true to $n+1$ significant figures. Later in the same book he states that if the probable error of the average be large, it is better to express the average to only n significant figures.

A rule generally used in physics and engineering is this[3]: "In all deviation and precision measures retain two, and only two, significant figures. . . . The place of figures corresponding to the *first* significant figure of the deviation measure is somewhat uncertain (from 1 to 9 units), while the place corresponding to the *second* significant figure in the deviation measure is uncertain by ten times this amount (10 to 99 units). Beyond this place the significance of additional figures is so slight as to be of no value."

Since the errors of measurement are ordinarily tremendously greater in biological, economic and social investigations than in physical observations, the retention of more than one doubtful figure in a constant is unjustified. Therefore when final results are published, the second doubtful figure should be dropped and the constants expressed to the figure that corresponds with the first significant figure of their respective precision measures. In all other data, and in computations, retain as many places of figures as correspond to the second place of significant figures in the pertinent deviation or precision measure. Two places of doubtful figures are thus retained so that accumulated errors due to rejections in the course of a computation may not affect the first place of uncertain figures in the result.

Many workers in the social and biological sciences are not mathematicians and use statistical analysis only as a necessary tool. For these, a definite, simple, yet mathematically sound rule is desirable. The writer suggests the following working rule: *In a final published constant retain no figures beyond the position of the first significant figure in the standard error; keep one more place in all computations.*

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[1] Italics by the writer.
[2] SCIENCE, 60: 524, 1924.
[3] H. M. Goodwin, "Precision of Measurements and Graphical Methods," pp. 23–24.

PARAMECIUM MULTIMICRONUCLEATA VS. PARAMECIUM MULTIMICRONUCLEATUM

IN 1910 Powers and Mitchel[1] reported and described a new species of *Paramecium*. Powers speaks of it as a multimicronucleate type: Mitchel calls it *Paramecium multimicronucleata*. Article 14 of the International Rules of Zoological Nomenclature, speaking of specific names, states that adjectives, used as specific names, must agree grammatically with the generic name. *Multimicronucleatum* is used by Mitchel as a descriptive adjective, and since *Paramecium* is a neuter singular noun, the descriptive adjective must also have the neuter singular form.

Landis,[2] Wenrich,[3] Lieberman,[4] King,[5] Giese,[6] Diller,[7] Duodorff,[8] have followed Powers and Mitchel in using *multimicronucleata*. But Hance,[9] Lucas,[10] Stranghöner,[11] Müller,[12] Glaser,[13] Köster,[14] Frisch,[15] Jones[16] and Oliphant[17] use the grammatically correct form, *multimicronucleatum*.

Article 19 of the International Rules of Zoological Nomenclature states that "the original orthography of a name is to be preserved unless an error of transcription, a lapsus calami, or a typographical error is evident." An error of transcription and a typographical error can be ruled out. Can the mistake be called a

[1] J. H. Powers and Cl. Mitchel, *Biol. Bull.*, 19: 324–332, 1910.
[2] E. M. Landis, *Jour. Morph. and Physiol.*, 40: 111–167, 1925.
[3] D. H. Wenrich, *Trans. Amer. Micros. Soc.*, 47: 274–284, 1928.
[4] Paul R. Lieberman, *Trans. Amer. Micros. Soc.*, 48: 1–11, 1929.
[5] Robert L. King, *Jour. Morph.*, 58: 555–564, 1935.
[6] A. C. Giese, *Physiol. Zool.*, 8: 116–125, 1935.
[7] William F. Diller, *Jour. Morph.*, 59: 11–49, 1936.
[8] Michael Duodorff, *Jour. Exp. Zool.*, 72: 369–386, 1936.
[9] R. J. Hance, *Jour. Exp. Zool.*, 23: 287–333, 1917.
[10] Miriam Scott Lucas, *Proc. Soc. Exp. Biol. and Med.*, 27: 258–260, 1930.
[11] E. Stranghöner, *Arch. f. Protistenk.*, 78: 302–360, 1932.
[12] Walter Müller, *Arch. f. Protistenk.*, 78: 361–462, 1932.
[13] R. W. Glaser, *Jour. Parasitol.*, 19: 173, 1932.
[14] Willy Köster, *Arch. f. Protistenk.*, 80: 410–433, 1933.
[15] J. A. Frisch, S.J., SCIENCE, 81 (2109): 537, 1935.
[16] Edgar P. Jones, *Anat. Rec.*, 64: 108–109, 1935.
[17] Joseph F. Oliphant, *Anat. Rec.*, 64: 77, 1935.

lapsus calami? Probably not. How, then, can the change to the correct form be authorized?

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TROCHOSPONGILLA HORRIDA IN ARKANSAS

WE report the presence of *Trochospongilla horrida* Weltner in the East Fork of the White River near Elkins, Arkansas. The colonies collected were on the under side of stones in a shallow portion of the river where the water is scarcely flowing. The flat, branching colonies were a dirty white in color. Gemmules were present in specimens collected on July 23, 1936. The strongly spined skeletal spicules and the birotulate gemmule spicules with smooth entire margins make the identification certain.

Although reported in recent years from such far apart localities as Germany, Russia, Turkestan and China, *T. horrida* appears to have been found in the United States only four times: twice in Illinois,[1] once in Delaware[2] and the present collection in Arkansas. It appears to be the first fresh-water sponge to be reported from the state of Arkansas.

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WANTED: A NEW WORD

THE word should be from the Greek because a companion word is from that language, although the late Professor Burt G. Wilder said that a mule word might be as useful as a mule animal. He quoted appendicitis in this connection.

There is a large literature relating to planktonic food for many kinds of organic life. An equally large literature should belong to benthotic food, but the awkwardness of the expression is doubtless responsible for its hiding out of literature. According to the dictionary "benthos" relates to the bottom of the sea. This is not descriptive in application for the food of many forms of aquatic life living in shallow waters—for example, that of mollusks, fishes and even young ducks which feed upon the layer of living organic matter resting upon the top layer of mud in shallow water. Among the fishes we know that hypoglossidae, catostomidae and siluridae may thrive upon this top layer of mud without depending upon larger organic prey. We all know the roundish marks on the top layer of mud made by the fishes commonly known as suckers. I could not account for long scoops made on the top layer of mud until one cloudy afternoon standing upon the railroad track near Union Springs, New York, I watched a number of bullheads feeding. They would stick the tip of the lower jaw a little way into the mud and then with a few quick movements of the caudal fin they would force themselves ahead, making the mysterious scoop markings on the mud.

At the foot of our lawn in Stamford young wild ducks know enough to feed upon the top layer of mud without being taught by parents until they are large enough to eat Nuttall's pondweed and the cracked corn which we give them.

Flounder fishermen of the Great South Bay say that mud is the only food in the stomachs of millions of flounders after they are thin from February spawning. It would be difficult for these millions of flounders to find other food. That takes me to the question if the "sideswiping" mouth of flounders is not a matter of adaptation of a species to food conditions in the course of descent.

Many years ago as a boy at New Haven I took home a fish basket of young bullheads still alive that my father said were not worth the bother of skinning. I took them to the numerous small pond holes in Beaver Meadows west of New Haven and forgot them until the meadows were filled in, when local residents collected basketfuls of well-fed bullheads as the filling in crowded them out. There was little beside the top layer of mud for them as food supply. Now I want a word for this food supply. I have asked my friends who are Greek and Latin scholars, but they have failed me after my own limitations had been reached.

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SPECIAL ARTICLES

THE ULTRACENTRIFUGAL CONCENTRATION OF PNEUMOCOCCIC ANTIBODIES

THE ultracentrifugal analysis[1] of concentrates of the Type I pneumococcic antibodies from horse serum has shown that their proteins consist mainly of molecules with a sedimentation constant of about 16×10^{-13} cm. sec^{-1} $dynes^{-1}$. This, together with the presence of such molecules in the untreated antipneumococcic horse serum and their complete or almost complete absence from normal serum, is evidence that they are the real bearers of the antibody activity. Further support for this view is supplied by the observation[2] that after ultracentrifugation, most of the antibody activity appears at the bottom of the cell. The fol-

[1] Frank Smith, *Bull. Ill. St. Nat. Hist. Surv.*, 14: 11: 9–22, 1921.

[2] M. C. Old, *Trans. Amer. Micr. Soc.*, 51: 4: 239–242, 1932.

[1] J. Biscoe, F. Herčík and R. W. G. Wyckoff, SCIENCE, 83: 602, 1936; M. Heidelberger, K. O. Pedersen and A. Tiselius, *Nature*, 138: 165, 1936.

[2] M. Heidelberger, K. O. Pedersen and A. Tiselius, *op. cit.*