SCIENTIFIC JOURNALS AND ARTICLES

THE July number (volume 12, number 3) of the *Transactions of the American Mathematical Society* contains the following papers:

E. R. Hedrick: "On properties of a domain for which any derived set is closed."

J. E. Rowe: "Important covariant curves and a complete system of invariants of a rational quartic curve."

A. B. Coble: "An application of Moore's cross ratio group to the solution of the sextic equation."

G. A. Miller: "On the use of the co-sets of a group."

W. H. Roever: "The southerly deviation of falling bodies."

Virgil Snyder: "An application of a (1–2) quaternary correspondence to the Kummer and Weddle surfaces."

O. E. Glenn: "On semi-discriminants of ternary forms."

THE June number (volume 17, number 9) of the *Bulletin of the American Mathematical Society* contains: Report of the April meeting of the San Francisco Section, by H. C. Moreno; "Invariant conditions that a p-ary form may have multiple linear factors," by O. E. Glenn; "The general term of a recurring series," by Arthur Ranum; "Relations between the Gramian, the Wronskian, and a third determinant connected with the problem of linear dependence," by D. R. Curtiss; "Note on the integration of series by Lebesgue integrals," by W. A. Wilson; Review of Eisenhart's Differential Geometry, by G. A. Bliss; Review of Stuyvaert's Cinq Etudes de Géométrie analytique, by E. G. Bill; "Shorter Notices": Duhem's Etudes sur Léonard de Vinci, by D. E. Smith; Young's Fundamental Theorems of the Differential Calculus, by N. J. Lennes; "Notes"; "New Publications."

THE July number of the *Bulletin* (concluding volume 17) contains: Report of the Chicago meeting of the society, by F. N. Cole; "On the negative discriminants for which there is a single class of positive primitive binary quadratic forms," by L. E. Dickson; "Iterated limits of functions on an abstract range," by R. E. Root; "Note on a Mersenne number," by H. J. Woodall; "Shorter Notices"; Brenke's Advanced Algebra and Trigonometry and Davisson's College Algebra, by Arnold Dresden; Loria-Schütte's Spezielle algebraische und transcendente Kurven, by C. L. E. Moore; Encyklopädie der Elementar-Mathematik, erster Band, by F. W. Owens; Netto's Determinanten and Timerding's Theorie der Kräftepläne, by J. B. Shaw; Föppl's Technische Mechanik, Band 6, by E. B. Wilson; "Notes"; "New Publications"; "Twentieth annual list of papers read before the society and subsequently published"; Index of volume.

SOME MISTAKES BY THE WRITER AND OTHERS, WITH A PLEA FOR PROMPT AND EXPLICIT CORRECTION IN A JOURNAL OF GENERAL CIRCULATION AMONG SCIENTISTS

LONG contemplated, the immediate occasion of this article is indicated in the following statement, substantially a copy of a letter dated January 31, 1911, and addressed to Dr. Ales Hrdlicka, curator of the Anthropological Division of the U. S. National Museum.

I submit two calvas and this statement. In February, 1880, there was received at my department of Cornell University (then including human anatomy) the head of a mulatto of medium color. From the features it was believed to be a male, and in my absence the age was estimated by Professor S. H. Gage at between 28 and 35 years.[1] The brain was hardened *in situ* by Professor Gage by the injection of the preservative through the arteries, and then removed by the sagittal division of the calva.[2] The calva was prepared and dated by Professor Gage, and later given the number, 322, of the brain.[3] The rest of the skull, with the

[1] Professor Gage has since informed me that he thinks the head was sent from New York by the late Dr. M. J. Roberts; also that there was never any doubt in his mind as to the sex; probably it was stated in the letter of transmission.

[2] As described in the "Reference Handbook of the Medical Sciences," first edition, Vol. 8, p. 199; second edition, Vol. 2, p. 375.

[3] All the parts and organs of one individual receive one and the same accession number. The brain is represented in the "Handbook," Figs.

soft parts attached, was preserved for a time but cannot now be found. Of late years brains have occupied most of my attention. The mulatto calva was misplaced in one of the cases of skulls; I even forgot that it was in two parts, as are several others. I did remember, however, that it was unusually thin, even for a Caucasian. In the spring of 1909, when preparing my address on the "Brain of the American Negro," by way of emphasizing my warning not to generalize from single specimens, which might be quite exceptional, I took the thickest calva in the collection, that of a white murderer (Ruloff, No. 965) and the thinnest, which I supposed to be that of the mulatto of 1880. It then bore no number or other mark of identification, but it has since been numbered 6070. It and the calva of Ruloff were shown at the conference and afterward photographed side by side as Fig. 1 of the published address. Since my retirement, while revising the museum and its records for my successors, the mulatto calva of 1880 has been found, bearing Professor Gage's original date and the number, 322; of its identity there can be no doubt. Of course a correction and explanation must be published.[5] First, however, I desire to ascertain the extent of the misapprehension that may have been caused by the unintended substitution of the calva 6070 in Fig. 1 of my address. Does it, either in the published figure (which is all that readers of the address have to judge from) or in the actual specimen, exhibit any feature incompatible with its being from the mulatto? For a frank opinion I shall be very grateful.

Following is the report of Dr. Hrdlicka:

The calva marked C. U., 322, Male Negro, presents nothing that would suggest that race. The thinness is very unusual. It was probably from a small and not very strong individual. It is deformed in an uncommon way, due to premature synostosis of large portions of the coronal suture on each side, the like of which I have not seen in either negro or mulatto. The parietal eminences are much more pronounced than is generally the case in the negro or even the mulatto, and the occiput is without any protrusion, which is also unlike what is most commonly observed in the two classes named. The calva marked C. U., 6070, may well have been from a male. It bears several fairly plain negro characteristics and would well agree with being that of a mulatto. The evenly rounded forehead, the narrowness of the anterior half of the vault, the premature, not physiological, obliteration of the sagittal suture, are all strong signs pointing in this direction. The ventral conformation of the frontal part of the vault is typically negro-like.

Summary and Comments.—(1) Calva 6070 is not (as supposed when the address on the brain of the American negro was prepared and printed) that of the mulatto, 322, obtained in 1880. There is no documentary evidence that it was from any individual of the African race. Hence it must not be employed in any racial generalization.

(2) But it is about as thin as the true mulatto calva, 322; both of them are exceptionally thin for either race, while calva 965, from a white murderer, is exceptionally thick for either race.

(3) According to high anthropologic authority calva 6070 "bears several plain negro characteristics, and would well agree with being that of a mulatto."

(4) The publication of this correction has been delayed in the hope to ascertain the identity of calva 6070 from former students and assistants in various parts of the country.[6]

(5) No similar error has occurred among the specimens in my charge. I alone am to blame. Self-correction is not a pleasant task; still less pleasant, however, would be the consciousness that silence might mislead others and eventually cast a doubt upon the accuracy of our records, hitherto unimpeached.

2. In 1875, while formulating a "provisional arrangement of vertebrates according to cerebral [encephalic] and cardiac char-

4766, 4767, 4770 and 4772 of the first edition, and Figs. 762, 764, 765 and 766 of the second.

[4] Proceedings of the First National Negro Conference, pp. 22–66, with 13 figures. Reprinted.

[5] In addition to the copies distributed by the committee in charge of the conference I have given a thousand copies to scientists and personal friends.

[6] The lower part of the skull has both petrosals excavated as if for the study of the internal ear. This condition and the extreme thinness may recall the specimen to some one not already applied to.

acters,"[7] and while predisposed toward a reduction of the interval between the two great divisions of teleostome fishes, I stated that the olfactory bulbs contained cavities not only in the ganoids named but also in the teleostean genera, *Perca, Scomber* and *Anguilla,* and pictured the cavity, rhinocele, in the first named genus, as of considerable size and as surrounded with substantial walls; (plate 3, Fig. 14). Later observations showed that this cavity was an artifact produced by the beaded bristle employed as a "seeker."

This correction does not militate against the recognition of slight depressions at the base of the sessile olfactory bulbs such as were described and figured by me in 1876 (*A. A. A. S. Proc.,* p. 258 and Figs. 12 and 13); much less does it contravene the represtation of the rhinocele by a cavity having only a membranous roof on the dorsal side of the bulb itself when sessile, or on the dorsal side of its peduncle when the bulb is located at a distance from the rest of the brain.

3. My participation, up to 1876, in the then prevailing non-recognition of "the morphologic importance of the membranous or other thin portions of the parietes of the encephalic cavities" has been clearly admitted and sufficiently regretted in a paper[8] entitled as in the words quoted above. The general remarks in that paper on self-correction and on the private correction of others are commended to scientists generally.

4. In the articles on the brain in both editions of Buck's "Reference Handbook of the Medical Sciences" I systematically followed the plan, then and still somewhat unusual, of enumerating the defects of the illustrations. Such as have been subsequently noted in vol. 2 of the second edition are now specified.

(*a*) Fig. 670. The convexity of the albicans should have been shaded as a retreating, natural (pial) surface, as in Fig. 687.

(*b*) Fig. 687. The unaccountable black spot in the center of the middle commissure should be erased; it does not appear in Fig. 801, of part of which Fig. 687 is an enlargement.

(*c*) Wherever they occur *conarium* and *epiphysis* should be replaced by *pinea.* With *medicornu, medicommissure,* and *medipeduncul*us, as Angloparonyms of the Latin forms, the prefix should be *mid-*.

5. My paper on "Neural Terms"[9] was prepared under considerable pressure of regular duties and contained many verbal errors. Some of these were specified in the "Additions and Corrections" on p. 352. Such as were detected later were enumerated on a leaflet entitled "Errors and Omissions" dated March 30, 1898. Copies of this leaflet were distributed to recipients of reprints of the paper, and others are at the service of those who have files of the journal in which it appeared. On p. 306 of the paper itself, at number 122, in the first and second columns, "inflecta" should be *inflexa.*

6. Most preserved human fetal cerebrums of the third and fourth months present linear depressions not found at later periods. Like Cunningham and some other anatomists, up to 1903, I regarded these "transitory fissures" as normal, although my brief discussion of them before the Association of American Anatomists[10] contained the query, "Are any of them merely artifacts?" With most of them the non-existence of a corresponding fold of pia should have suggested that explanation. The observations of Retzius, Hochstetter, Mall[11] and G. Elliott Smith[12] upon fresh and unaltered cerebrums showed that they are truly artificial features caused by either post mortem corrugation or the pres-

[7] On the brains of *Amia, Lepidosteus, Acipenser* and *Polyodon. Amer. Asso. Adv. Science, Proceedings,* 1875, pp. 168–194.

[8] *Journal of Comparative Neurology,* Vol. I., pp. 201–203, October, 1891.

[9] "Neural Terms, International and National," *Journal of Comparative Neurology,* VI., December, 1896, pp. 216–352, including seven tables. Parts VII.–IX. have also been reprinted under the title "Table of Neural Terms, with Comments and Bibliography."

[10] *Proceedings,* May, 1894, p. 33.

[11] *Amer. Jour. Anatomy,* Vol. 2, pp. 333–339.

[12] *Anat. Anzeiger,* Vol. 24, pp. 216–220.

sure of membranous folds at the coronal and lambdoidal sutures.

Having now explicitly corrected my own more important errors[13] I venture to point out a few cases in which a similar course might well have been followed by others.

7. In both German and English editions of Wiedersheim's "Comparative Anatomy of Vertebrates," in his "The Structure of Man," and in other works into which it has been copied, is what purports to represent the base of the brain of the rabbit as a representative mammal. One of the constant and peculiar characters of that class is the pons, a mass of obviously transverse fibers at the ventral side of the cerebellum. In this figure the region is marked *pv.*, and the abbreviation is said to stand for "pons Varolii," but the contour and the shading give not the least idea of its essential character; indeed, the mesal furrow is more distinct than in the bird on the opposite page. To the serious and needless misrepresentation attention was called in SCIENCE for May 8, 1908, p. 741.[14]

8. In 1906 was published J. B. Johnston's "The Nervous System of Vertebrates." In January, 1908, his attention was called to the fact that Figs. 2 and 120, said to represent "the mesial surface of the right half of the brain of *Squalus acanthias*" (the acanth or spiny dogfish), must be of the smooth dogfish, *Mustelus*. The latter genus exhibits a decidedly more advanced morphologic stage as to the cerebellum and the cerebral extensions; indeed the two genera are placed by zoologists in not only separate families but different divisions or suborders. In 1909, in a paper[15] by the same author, the figure is reproduced and correctly named; but the statement that it was taken from the earlier work is unaccompanied by any intimation of the original misnomer. Even had it been, students and general readers are more likely to consult the book than the comparatively technical journal, and even instructors are none too familiar with selachian brain forms; the original misnomer was not mentioned in the reviews in SCIENCE, December 28, 1906, in the *Anatomischer Anzeiger*, November 9, or in the *Journal of Comparative Neurology and Psychiatry*, Volume 16, pp. 467–470;[16] hence it would have been more just to others and better for himself if the author had published a prompt and explicit correction in SCIENCE.

9. In 1893 the late Wilhelm His published[17] a figure described as "Medianschnitt eines menschlichen Gehirns vom Erwachsenen." As a mere diagram of general features it might serve the purpose for which it was intended; as purporting to represent a comprehensive, complex, and important aspect of the brain it embodies at least twenty errors or omissions and would not have been accepted from a member of my class in the morphology of the brain at any time during the last twenty years; especially does it fail to indicate the circumscription of the cavities and the demarcation of the artificial (cut) surfaces from the natural ones covered by pia or

[13] For reminders of others that have caused or might cause misapprehension I shall be grateful.

[14] An interval of three years should have sufficed for the replacement of the same faulty figure by a correct one in the recently issued edition of Parker and Haswell's "Textbook of Zoology," Vol. 2, p. 468. This new edition likewise repeats the erroneous designation of the lamprey represented in Fig. 793 (Fig. 749 of the first edition) as *Petromyzon marinus* (sea lamprey) whereas it is *P. fluviatilis* (river lamprey) in the original paper of W. K. Parker, *Philosophical Transactions*, Vol. 74, 1882, plate 8; the arrangement of the teeth is very different in the two species, and the error is sure to cause confusion. T. J. Parker, the senior author of the work, and W. N. Parker, the associate editor of the second edition, are both sons of the author of the paper. Surely the latter would have insisted upon the correction had he been informed of the misnomer, to which the attention of the publishers was called by me at least two years ago.

[15] The morphology of the forebrain vesicle in Vertebrates. *Journal of Comparative Neurology and Psychiatry*, November, 1909, pp. 457–539.

[16] This review did correct the misplacement of Figs. 175 and 177 and of Figs. 176 and 178.

[17] "Vorschlage zur Eintheilung des Gehirns," *Archiv für Anatomie, etc.*, Anat. Abth., pp. 172–179, Fig. 3.

endyma. These defects were pointed out by me in 1899,[18] but in the present paper they are of interest mainly as neither corrected nor even alluded to in any of the reproductions of the figure known to me.

The figure and description are given on p. 876 of the protocols of the committee (of the Anatomische Gesellschaft) on anatomic nomenclature in the fasciculus dated March 20, 1894; these protocols were edited by W. Krause.

But in the following year, in the final report,[19] commonly known as the "B N A," supervised and explained by His himself, the same figure appears on p. 161 as "Mediandurchschnitt durch ein fötales menschliches Gehirn aus dem dritten Monat." It may be conjectured that there had occurred an inadvertent repetition of the legend under the figure on the opposite page (where, however, the first word is "Medianschnitt"); but it is not easy to understand how so self-evident an error could escape the other members of the committee.

With the original correct designation of "adult" the figure was reproduced in 1897 by van Gehuchten (Anatomie du systeme nerveux de l'homme, second edition, Fig. 17), and in 1899 by L. F. Barker (The Nervous System and its Constituent Neurones, Fig. 92).

But in 1901 the identical figure, reduced about one third, was employed by Barker[20] and described as a "Median section through a human fœtal brain of the third month, after His, 1892" [probably 1893 was meant].

[18] Comments upon the mesal [median] aspect of a human brain as published by His and reproduced by him and others. *Asso. Amer. Anatomists, Proceedings*, 1899, pp. 23–24.

[19] "Die anatomische Nomenclatur. Nomina anatomica, Verzeichniss der von der Anatomischen Gesellschaft auf ihrer IX. Versammlung in Basel angenommen Namen. Eingeleitet und im Einverständniss mit dem Redactionsausschuss erläutert von Wilhelm His." *Archiv für Anatomie und Physiologie.* Anat. Abth., Supplement Band, 1895. O., pp. 180; 27 figs., 2 plates, 1895.

[20] Buck's "Reference Handbook of the Medical Sciences," second edition, Vol. 2, Fig. 939.

Students and lay readers might easily be confused or actually misled by the discrepancies indicated above. As yet no explanation or expression of regret has been encountered by me. Fitting opportunity would seem to have been provided for Professor His in his article on nomenclature in the *Anatomischer Anzeiger,* Vol. XII., October 30, 1896, and for Dr. Barker in his "Anatomical Terminology with special reference to the B N A," 1907.[21]

The injuriousness of an uncorrected error depends not alone upon its intrinsic extent but also upon certain extrinsic conditions, viz., (*a*) the number and status of those who are interested in the subject and therefore liable to be misled; (*b*) the publication in which it appeared; (*c*) the evidence of its unchallenged acceptance by others; (*d*) the number of repetitions; (*e*) the reputation of its originator. To these self-evident propositions should perhaps be added the reminder that one need not himself be inerrant in order to point out imperfections in another.

The desirability of the explicit correction of errors under some circumstances has now, I trust, been indicated by example as well as by precept.

BURT G. WILDER

ITHACA, N. Y.,
April 6, 1911

[21] So far as I know, the "Isthmus rhombencephali" was never withdrawn by Professor His or, explicitly, by any of the several who adopted it; see the papers by B. B. Stroud and the writer, Association American Anatomists, Proceedings, 1899, and SCIENCE, March 16, 1900.

SPECIAL ARTICLES

THE SINGLE CYCLE DEVELOPMENT OF THE GRAND CANYON OF THE COLORADO

SEVERAL years ago Davis[1] called attention to a number of facts which lead him to conclude that the Grand Canyon of the Colorado has been developed in a single cycle of erosion as contrasted with the two cycles postulated

[1] "An Excursion to the Grand Canyon of the Colorado," *Bull. Mus. Comp. Zoology,* Harvard College, XXXVIII., May, 1901.