facts. There are any number of interesting questions involved in the situation. The right of municipalities to support institutions, especially professional and technical schools, in whole or in part by taxation; the practicability of combining endowments with public revenues in the maintenance of universities; the policy of appointing a governing board by political agencies as contrasted with a self-perpetuating board; the question of large administrative boards as contrasted with small ones; the principle of alumnal representation in governing bodies; the right of constituent faculties to representation in the directory, and the results thereof; the right of faculties to nominate their own associates, and the results thereof; the tenure of professional appointments and the obligations, moral and legal, of universities to their executives; are a few themes suggested by recent events in the University of Cincinnati. X.

NATURAL AND UNNATURAL HISTORY.

TO THE EDITOR OF SCIENCE: Every student of comparative psychology who has at heart the cause of sound education must welcome such criticisms of the writings of Mr. William J. Long as have appeared in recent numbers of SCIENCE.* Not because Mr. Long deserves, on his merits, either criticism as a naturalist or condemnation as a teacher, but solely because of the far-reaching influence for evil which must inevitably attend the wide circulation of his books, and their possible offspring, through the schools. The present writer has not asked for space in your journal in which to review the numerous publications of this facile fabricator of fiction, nor yet to discuss the indisputable facts of animal behavior and intelligence which have suffered such distortion at the hands of Mr. Long—to name only the chief of a whole tribe of popular writers who, by the prostitution of their talents, have brought upon themselves the just censure not only of naturalists, but of all right-minded educators.

Since the sad case of the Rev. William J. Long has already been brought forward in your journal, it would seem only fitting that it should be still further presented in all its preposterousness. Let it be understood from the outset that no personal feeling of any sort whatever prompts or accompanies this letter, which is intended solely to place on record a few reflections suggested by the recent controversy in the popular press and the aforesaid communications to SCIENCE, with a view to enlisting still further, perhaps, the interest of scientific men on behalf of a real educational need, and, indirectly, of warning educators against the adoption of a point of view and a method which threaten to make of 'nature-study' not merely a farce, but an abomination to science and a menace to educational progress. Although the writer can have no personal quarrel with Mr. Long, with whose very name he was unfamiliar until Mr. Burroughs—perhaps unwisely?—brought it into unmerited prominence, the duty does not on this account devolve upon him of examining here the statements of *all* our popular interpreters of nature. Mr. Long, to whom public attention is temporarily directed by reason of certain rather ludicrous circumstances, is taken merely as a type of his species. (Doubtless there are naturalists who would limit this particular species to the type specimen!) Mr. Thompson-Seton has also disseminated vicious notions of animal mentality, but, apart from his inexcusable prefatory insistence upon the essential truthfulness of his narratives, and certain matters of taste which scarcely fall within the scope either of this letter or of your journal, his case may be dismissed as relatively unimportant. Besides, it is whispered that he has *reformed.* If Mr. Long is but one among many offenders, he is *facile princeps,* and Mr. Thompson-Seton should not be named in the same breath. Moreover, one may doubt Mr. Long's capacity for reform. As a romancer he does not stand alone, but as a 'hopeless romancer' he occupies a unique position. This is because of his inordinate gullibility. If it turn out that

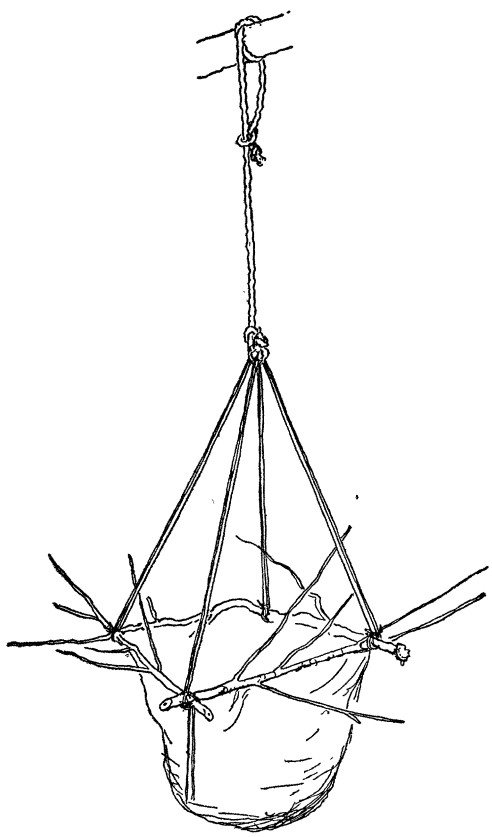
* 'Woodcock Surgery,' by William Morton Wheeler, SCIENCE, N. S., Vol. XIX., No. 478, pp. 347–350, February 26, 1904; 'The Case of William J. Long,' by Frank M. Chapman, SCIENCE, N. S., Vol. XIX., No. 479, pp. 387–389, March 4, 1904.

Mr. Thompson-Seton has really reformed, we shall no longer be permitted to accuse him of gullibility. Meanwhile alternative hypotheses need not concern us here.

That Mr. Long is a 'hopeless romancer' has already been abundantly proved by Mr. Burroughs's article in the *Atlantic Monthly* for March, 1903,* which, although obviously unfair in spots, must be regarded as essentially sound, and in some respects even 'too temperate,' as Mr. Wheeler has said. If anything remained to be added to Mr. Burroughs's effective criticism of Mr. Long's 'sham natural history,' the deficiency has been bountifully supplied by Mr. Wheeler and Mr. Chapman, both eminent as scientific naturalists.†

It would also seem a work of supererogation to attempt further to establish Mr. Long's gullibility, especially after Mr. Chapman's excellent letter, with its telling quotations. Indeed, I have no intention of arguing the matter further, but I happen to have in my possession a carefully prepared outline sketch, executed by Mr. Clifton Johnson, the well-known illustrator, of a mare's nest which Mr. Long has seen fit to describe as the work of orioles, and (by the owner's permission) I beg leave to reproduce it in your journal, that your readers may judge for themselves of Mr. Long's competency to instruct the youth of our land in the 'Secrets of the Woods.' I quote for comparison Mr. Long's own account of this nest and the manner of its fabrication, from his article on 'The Modern School of Nature-Study and its Critics' in the *North American Review* for May, 1903 (pp. 688–698):

Last spring, two orioles built in a buttonwood tree, after having been driven away from their favorite elm by carpenters. They wanted a swinging nest, but the buttonwood's branches were too stiff and straight; so they fastened three sticks together on the ground in the form of a perfectly measured triangle. At each angle they fastened one end of a cord, and carried the other end over and made it fast to the middle of the opposite side. Then they gathered up the loops and fast-



ened them by the middle, all together, to a stout bit of marline; and their staging was all ready. They carried up this staging and swung it two feet below the middle of a thick limb, so that some leaves above sheltered them from sun and rain; and upon this swinging stage they built their nest. The marline was tied once around the limb, and, to make it perfectly sure, the end was brought down and fastened to the supporting cord with a reversed double-hitch, the kind that a man uses in cinching his saddle. Moreover, the birds tied a single knot at the extreme end lest the marline should ravel in the wind. The

* 'Real and Sham Natural History,' *Op. cit.*, pp. 298–309.

† One could have wished that Mr. Wheeler had not felt obliged to indulge in that rhetoric about osteogenesis, etc., presumably intended to take off Mr. Long's manner, but incidentally serving to prejudice certain readers against an otherwise convincing criticism. Surely Mr. Wheeler does not believe that the average country doctor, who sets all the broken bones of his township is 'deeply versed in osteogenesis'! Nor would he deny him, on this account, his proper share of intelligence.—*Non potest non peccari.*

nest hangs above my table now, the reward of a twenty-five years' search; but not one in ten of those who see it and wonder can believe that it is the work of birds, until in the mouths of two or three witnesses who saw the matter every word has been established (p. 692).

Let the description be compared with the sketch; let it be observed that Mr. Long does not affirm that he himself 'saw the matter' (*i. e.*, the fabrication of the nest by the birds?); let it be remembered, however, that Mr. Long accepts this remarkable structure as the work of orioles—there are the usual 'two or three witnesses' (one can not help wondering if they are the same 'friends' who have played so many practical jokes on Mr. Long), and, above all, from Mr. Long's point of view, *there is the nest itself, which hangs above his table now,* unless some ill fate has befallen it since last May, when the article appeared. This episode of the nest reveals a general incapacity for the estimation of evidence which must vitiate everything else that Mr. Long reports. *Falsus in uno, falsus in omnibus.*

The article in question is such a remarkable production throughout that, perhaps, we should not take leave of it without quoting a few characteristic passages, which may serve to set forth Mr. Long's curious creed.

"The study of Nature," we are told, "is a vastly different thing from the study of Science; they are no more alike than Psychology and History. *Above and beyond the world of facts and law, with which alone Science concerns itself, is an immense and almost unknown world of suggestion and freedom and inspiration, in which the individual, whether animal or man, must struggle against fact and law to develop or keep his own individuality.* It is a world of 'appreciation,' to express it in terms of the philosophy of Professor Royce, rather than a world of 'description.'* It is a world that must be interpreted rather than catalogued, for you can not catalogue or classify the individuality for which all things are struggling. * * * This upper world of appreciation and suggestion, of individuality interpreted by individuality, is the world of Nature, the Nature of the poets and prophets and thinkers. Though less exact, it is not less but rather more true and real than Science, *as emotions are more real than facts [sic], and love is more true than Economics*—* * * 'I study facts and law; they are enough,' says the scientist. 'We know the tyranny of facts and law too well,' answer the nature-students. 'Give us now the liberty and truth of the spirit.' * * * In a word, the difference between Nature and Science [*sic*] is the difference between a man who loves animals, and so understands them, and the man who studies Zoology" (pp. 688–689.—Italics mine here and throughout).

Scarcely could the 'miraculous' vocalizations common among the earlier Christians have been more unintelligible than this. Such crude misapprehension of contemporary philosophic discussions, such hopeless confusion of categories, such aimless emission of words—mere words,—such pitiful cries of an individual struggling against every fact and law, both of thought and of language, 'to develop or keep his own individuality' (which?), it would not be easy to match outside the literature of Christian Science. Specific comments upon our subject's phraseology would spoil the flavor of the original.*

Men of science should perhaps pause to reflect, in the presence of such crass misrepresentations of the nature and scope of science, whether they may not be responsible, in some measure, for the state of affairs which has made it possible for a confessed intellectual anarchist like Mr. Long to obtain a hearing in the schools. If 'nature-study' is what it is above represented to be, let us return without delay to the respectable, if meager, modicum of knowledge comprehended under the one-time useful trinity of R's; but if 'nature-study' has for its object the observation of fact and the recognition of law, without sacrifice of inspiration—if it

* Mr. Long evidently believes in hitching his chariot to a star!

* What a fine case of mixed categories for Professor Münsterberg!—but Professor Münsterberg apparently thinks it unnecessary to dredge in such deep waters of sciolism for his specimens.

be capable of nourishing the normal growing mind—then let us see to it that it be pursued and taught according to the full measure of its possibilities as a legitimate source of inspiration.*

By just such a curious inconsequence as might have been expected from one given to 'speaking with tongues' as above, Mr. Long insists that he has been careful never to record an observation until he has 'verified' it from the testimony of another. The 'confirmation' of most of his stories has come from the guides and trappers of his acquaintance. But in a 'world of suggestion and freedom and inspiration' why bother about verification? Why trouble the trappers? Perhaps the trappers appreciate Mr. Long's 'struggle against fact,' and cheerfully lend their aid in behalf of the development and maintenance of his individuality!

But Mr. Long is not a consistent dreamer of dreams and confirmer of the same through the cross-questioning of trappers; he thinks it important to remind his readers that 'for over twenty years' he has 'gone every season deep into the woods.'* And his publishers, Messrs. Ginn and Company, have issued a little pamphlet,† by way of apologizing for their literary *protégé* and incidentally advertising his books (to all of which Mr. Long submits as if it were quite a dignified thing to be thus personally defended and advertised), in which the public is favored with reproductions *from photographs* of Mr. Long in his boat, of his camp in the woods, and the like. *Mr. Long has been on the ground!* But so have his 'wood folk.' *Mr. Long has been a field observer from his youth!* As much may be said of the wild ass.

Possibly even Mr. Long recognizes that mere camping out among the 'wood folk' is

* No objection is here implied to the frankly imaginative treatment of nature. The same 'fact' may be differently apperceived and transformed by the same mind for different purposes. There is an *artistic* observation as well as a *scientific* observation; accuracy being fundamental to both. Nobody can object, on *scientific* grounds, either to Shelley's relatively objective poems of nature, or even to Wordsworth's humanizing muse. Æsop's 'Fables' and Kipling's 'Jungle Books' are likewise secure from scientific attack. (This of course apart from a possible 'science of criticism.')

There is undeniably a place for *sympathy* in our relations with dumb animals, as in our relations with children; although between the mind of the most 'sagacious' mammal below man and the mind of the child which has outgrown the 'mewling and puking' age, there is probably an interval of considerable psychological significance. Josephine Dodge Daskam's clever stories about children, although not technically psychological, are nevertheless not contrary to fact. Her diminutive heroes and heroines are not made to appear interesting by being fantastically represented as stronger and wiser than their parents, or (like Mr. Long's animals) as differing radically in different localities—the youngsters of Massachusetts, for example, being revolutionary innovators in science and art and conscious critics of government, whereas children elsewhere stupidly make mud pies and dress dolls and harmlessly 'play police.'

But artistic creation apart, the 'natural history' point of view as distinguished from the formulation of quantitative or genetic 'laws,' represents at once a stage in the development of all natural science and a permanent aspect of its pursuit, as exemplified and expressed by nobody so sincerely and so happily withal as by the acknowledged masters of investigation themselves. Furthermore, the perception of 'law' has repeatedly given classic expression to what a scientific student of philosophy, the late Henry Sidgwick, first called 'cosmic emotion.' I am not even prepared to deny the legitimacy of metaphysical construction (possibly a species of quasi-poetry?) upon the basis of an assumed psychic homogeneity of the universe, such as we find reflected in polite literature, as, *e. g.*, in Robert Louis Stevenson's impressive *Pulvis et Umbra* (reprinted in the volume entitled 'Across the Plains,' Scribners, 1900).

* *Op. cit.*, p. 691.

† 'William J. Long and His Books: A Pamphlet Consisting Chiefly of Typical Letters and Reviews in Reply to Mr. Burroughs's Unwarranted Attack on Mr. Long.'—The unfortunate form of this authorized 'defence' of Mr. Long places one under an unpleasant obligation to refer more or less specifically to his personal qualifications,—an obligation from which one could wish to be released.

not in itself a sufficient qualification for the naturalist. Certainly Mr. Long's publishers know better, for they have taken pains, in the published apology already cited, to establish the competency of their author as a naturalist by an enumeration of the successive stages of his education. Quoting from *The Connecticut Magazine*,* they assert that 'his life has been one long search for the verities.' Unfortunately all searches are not rewarded, and length of search is after all of less moment than quality, which depends upon the searcher. Of the last we are told that "at eighteen years he made the sacrifice that few can measure, of giving up home, friends, money, position, to follow what seemed to him the truth," which, being interpreted, turns out to mean that he attended the Bridgewater Normal School, Harvard University, Andover Theological Seminary, Heidelberg University, where he took the degree of Ph.D., and the Universities of Paris and Rome! Are we to interpret this account of his martyrdom as an expression of educational cynicism?† But such self sacrifice is not in itself enough to make a good naturalist. 'He speaks four or five languages.' 'Four *or* five'—but if it should turn out that he speaks only four, and that five are requisite, what then becomes of the argument? No information is given relative to the candidate's preferences in neckwear, not to mention other equally relevant items. 'His specialties,' however, 'are philosophy and history,' and 'the study of nature and animal life is to him purely a recreation in a life of constant hard work,' yet 'it must be admitted that he brings to this study a rare training.' Granted! For it has not even been hinted that Mr. Long has ever studied any branch of natural science. But if philosophy is a specialty with him, perhaps biology is another: for he understands the one about as well—or as ill—as the other. (Witness the confusion of categories exhibited above.)

Let us see if Mr. Long's *methods* are as 'rare' as his training? The pamphlet is again at our service, with its fusillade of quotations from *The Ypsilantian, Our Animal Friends, The Christian Register, The Christian Advocate,* and all the rest! *The Ypsilantian** did not think it 'exactly nice' of Mr. Burroughs to write his *Atlantic Monthly* article; yet, at the risk of offending the good taste of *The Ypsilantian,* let us proceed in the interest of truth. Mr. Richard Burton has assured the readers of *The Boston Transcript*† that Mr. Long 'is a true naturalist, a scientist in quest of knowledge.' (This in spite of Mr. Long's assertion that nature and science differ as emotions differ from facts, and love differs from economics! *Hocus pocus, hocus pocus, X, Y, Z!*) The readers of *The Boston Herald*‡ know better; they know that "Dr. Long * * * never seeks exact facts, never studies consciously." Are we to infer that he dreams his stories? No, rather are we to believe Mr. Long's own account of his attitude toward nature, when he says (if correctly quoted by *The Boston Herald*— we have

* Vol. VIII., No. 1, Series of 1903, Pamphlet, pp. 2, 4.

† It is said that Mr. Burroughs has gone out of his way to emphasize the fact that Mr. Long is a clergyman. If this is true it would seem ungracious. Clergymen are, as a class, probably neither better nor worse than other respectable citizens. While a theological education is fraught with grave intellectual dangers, it certainly need not unfit a man for science, any more than a 'fulfillment of the requirements for the degree of Ph.D.' in a German university need fit a man for the same. There have been excellent naturalists who were clergymen to begin with. Mr. Burroughs's favorite, the good Gilbert White, is a case in point. Others, like the lamented Dr. Buckland, dean of Westminster, have attained eminence in natural science. Bitterness toward the clergy to-day strikes one as an anachronism. The ecclesiastic as we know him is either friendly towards science or indifferent to it, or, in any case, ineffectual against it. Time was of course when things were different; possibly Mr. Burroughs *remembers!* There remain, however, abuses enough to counteract without turning our wrath backwards. The dinosaurs have historical interest for us, although certain of our Mesozoic ancestors may have found it necessary to be veritable 'pragmatists' in their presence.

* July 16, 1903, Pamphlet, pp. 7–8.

† Date not given, Pamphlet, pp. 12–16.

‡ August 9, 1903, Pamphlet, pp. 18–19.

not the 'confirmation' of *The Ypsilantian* on this point): "I just love her, give myself wholly to her influence, expect nothing"—to which one is tempted to add, in the words of a current beatitude, 'Blessed are they that expect nothing, for they shall not be disappointed.' *The Boston Herald* is incidentally careful to explain how Mr. Long became a 'maker of many books.' "Before he was twenty he had filled a dozen note-books with curious, hitherto unrecorded habits of animals." A little later on "he prepared five articles, largely in fun, which, to his surprise, found ready acceptance and yielded a check of astounding proportions. Requests for book material followed, which he has since supplied at the rate of one or two books a year."

*Our Animal Friends** thinks Mr. Long's writings free of 'mawkish sentimentalism,' apparently because he does not insist that the hippopotamus is a 'beauty,' or the skunk a 'desirable companion.' And on July 9, 1903, *Public Opinion*† took the 'opportunity of reaffirming [its] belief in the correctness of Mr. Long's theories and of again advising the study of this author's work.' Just so, Mr. Hamilton Wright Mabie is quoted‡ as remarking that "Mr. Long has a fresh, sincere style, an eager curiosity, *and a trained habit of observation.*" Really, this is worthless from Mr. Mabie; yet just what one would have expected from this 'genial' preacher to the 'Christian Endeavorers of literature,' whose 'tolerance of temper' and 'mellifluous commonplaces' have apparently become too much even for the urbane, yet always discriminating, editor of the *Atlantic Monthly*.§ Nobody takes Mr. Mabie seriously as a critic of values any more. Nor should any man of letters, *as such,* presume to pass judgment on the competency of a naturalist for his task. If Mr. Long adds arrogance to ignorance, Mr. Mabie genially follows in his steps. A wise and far-seeing friend, and a man both able and eminent in science, is wont to predict that the science of the future will have to reckon painfully with a 'humanistic' opposition as dangerous as was the theological opposition of the past and far more insidious. Already there are signs of such an opposition, although as yet it acts chiefly as a stumbling block in the path of popular education; yet, to change the figure, it sometimes stands arrayed in the garb of education itself. *The New England Journal of Education** informs us that, "from Thoreau to Burroughs there has been no man quite so *lovable to wild animals* and to men at the same time as William J. Long. His experiences are well-nigh as fascinating in their way as were the songs of Jenny Lind." Speaking of Mr. Burroughs's criticism, it continues: "No one who has not made a saint of Burroughs and *has not been in love* with William J. Long, can appreciate the nightmare effect of that *Atlantic* article." But let us turn from this erotic effusion, and conclude our notice of Messrs. Ginn and Company's pamphlet by quoting Professor William Lyon Phelps, of the Department of English Literature in Yale University, who is reported as declaring that "*from the point of view of natural history,* as well as that of literary art, these books [by Mr. Long] are masterpieces."† Thus does the humanistic 'mush of concession' ever tend to 'debase the moral currency'; for it levels down as surely as it levels up, until all distinctions are obliterated, and truth remains just where Protagoras would have left it.

I need not discuss Mr. Long's modest-like defense of himself,‡ which would be ludicrous if it were not so pitiful—apart from certain just strictures upon minor faults of Mr. Burroughs's criticism. Which reminds one that Mr. Burroughs does not live in a house without some glass panes. But Mr. Burroughs knows that he has made mistakes, and knows how to account for them too. In the very *Atlantic* article which *The Ypsilantian* did not think was 'exactly nice,' Mr. Burroughs ac-

* August, 1901, Pamphlet, pp. 21–22.

† Pamphlet, p. 24.

‡ Reference not given, Pamphlet, pp. 16–17.

§ 'Mr. Mabie's Latest Book,' by B. P., *Op. cit.*, March, 1903, pp. 418–419.

* June 18, 1903, Pamphlet, pp. 8–11.

† Place not given, Pamphlet, p. 17.

‡ A letter from Mr. Long to the editor of *The Connecticut Magazine*, quoted in Pamphlet, pp. 25–32.

knowledges "the danger that is always lurking near the essay naturalist,—lurking near me as well as Mr. Sharp,—the danger of making too much of what we see and describe,—of putting in too much sentiment, too much literature,—in short, of valuing these things more for the literary effects we can get out of them than for themselves."* This is admirable, and reassures one in venturing upon an illustration of the way in which Mr. Burroughs has himself inadvertently yielded to this besetting temptation of the 'essay naturalist.' For I should be sorry to appear other than an admirer of Mr. Burroughs's writings; and even as a technical student of comparative psychology I agree in the main with his point of view, which I hope to discuss elsewhere, pointing out, for a wider public, what I regard, in the light of recent research, to be the limitations as well as the advantages of his somewhat arbitrary position on the rôle of instinct in animal life. Mr. Long's plea for animal individuality will then receive its full share of attention.†

* *Op. cit.*, p. 299.

† Mr. Long's contention that every boy who has watched animals has something to tell the 'naturalist' is not to be dismissed with a sneer. Some boys certainly have seen many things that no 'naturalist' has recorded. Nobody who has kept live animals feels that the stereotyped account of their behavior is quite adequate to the individual differences and the plastic 'accommodations' which they display; but these very individual differences and 'accommodations,' in so far as they have any importance, are themselves susceptible of *scientific* study. That they have not been sufficiently recognized in certain 'scientific' quarters can not be denied. But, if they have any meaning, they are 'facts' for the 'naturalist,' and as such have in the first place to be established on trustworthy evidence and then interpreted in accordance with 'law.'

The exceptional, even when true, can scarcely be said to furnish the basis for the most wholesome instruction in 'nature-study.' Nor is it of prime importance for science itself. *Cf.* E. L. Thorndike's remarks in his 'Animal Intelligence,' *Psychological Review*, Monograph Supplement No. 8, June, 1898, pp. 3–5. The widespread eagerness in the quest of the unusual and the gusto with which the anomalous is too often greeted when

This communication is not concerned with questions of interpretation. When it comes to these, the comparative psychologist finds himself in an embarrassing position. His work, if not actually scouted, is often lightly regarded by the neurologist and the pure physiologist, on the one hand, in the supposed interest of a mechanical explanation of nature, while, on the other hand, it is ignored by the ordinary naturalist, untrained in the analytic method of psychology, and poohpoohed by the 'educated public,' complacent in its anthropomorphic sentimentalism. The serious student of animal psychology labors under the disadvantage of having a popular subject to investigate! Wherefore he has constantly to be on his guard and may often seem to be 'carrying a chip on his shoulder' through no fault of his own. If he be not a pessimist, however, he must regard popular interest in his subject as in the long run a boon upon which he may favorably reckon.*

But I have wandered far from my promise to illustrate Mr. Burroughs's tendency to 'slip up' unawares. It is in one of Mr. Burroughs's less satisfactory articles, on 'The Ways of Nature,'† that we read the following description of the peculiar behavior of the common 'sissing or blowing adder' (*Heterodon platyrhinus*), when teased or persistently attacked:

> It seems to be seized with an epileptic or cataleptic fit. It throws itself upon its back, coiled nearly in the form of a figure 8, and begins a series of writhings and twistings and convulsive movements that is astonishing to behold. Its mouth is open and presently full of leaf mould, *its eyes are closed*, its head is thrown back, its white belly up; now it is under the leaves, now

it is found are symptomatic of an intellectual malady which threatens the very life of reason in the community.

* The camp of human psychologists is not a scientific Utopia, but that were too much to expect in a territory still overrun with such profound personal prejudices and imagined practical interests,—especially when the invaders are by nature so well-disposed towards the aboriginal enemy.

† *The Century Magazine*, Vol. LXVI., No. 2, pp. 294–302, June, 1903. Citation from p. 299.

out, the body all the while being rapidly drawn through this figure 8, so that the head and tail are constantly changing places, etc.

Surely these interesting phenomena are valued too much 'for the literary effects' to be got out of them; there is an unconscious *heightening* of the description, with the result that the eyes are described as 'closed,' whereas the snakes are characterized, and distinguished from the lizards, by the *absence of eyelids. Nor is there a nictitating membrane present.* Hence their eyes are set in a perpetual stare; although it is conceivable that their appearance might be (slightly) altered by certain movements, yet by no figure of speech could they be properly described as closed.* Mr. Burroughs's writings are of such service as to warrant correction; they are of such merit as to deserve it.†

While it is not my purpose here to sit in judgment *in re* Burroughs *vs.* Long, a characteristic difference between the two men may be noted, in passing, as it is revealed in their respective attitudes toward the great naturalists, Darwin and Wallace. Mr. Burroughs is always deferential, seeking, sometimes inadequately perhaps, to verify their results and to apply their conclusions, while Mr. Long distinctly implies that these observers labored under a serious disadvantage by reason of their limited opportunities for the study of animal life, as compared with his own unusual facilities, 'with Indian hunters' to his aid!*

The controversy between these gentlemen, as has been said, would not of itself warrant the sacrifice of so much space in your journal. "Where there is a manifest disproportion between the powers and forces of two several agents, upon a Maxime of reason, we may promise the Victory to the Superiour," as Sir Thomas Browne quaintly observes in his 'Religio Medici'; but, as he further reminds us, 'unexpected accidents' may 'slip in' and 'unthought of occurrences intervene,' which 'proceed from a power that owes no obedience to those Axioms' [of reason]. And surely in the case under consideration, such 'accidents' (if not 'unthought of occurrences') as popular prejudice, nourished by the indiscriminating leaders of the 'Christian Endeavorers of literature' and fed upon by shrewd publishers, have intervened, 'to make the worse appear the better reason,' and to gain, or momentarily to threaten to gain, the ascendency in the official instruction of youth.

In so far as I have seemed to take Mr. Long's case seriously, it has been only by way of warning, not against the particular extravagances of an individual, but against the unchecked diffusion of the false conceptions and meretricious standards, of which Mr. Long's teaching is typical and his following the unfortunate outcome. It is already too late and must needs be impossible, in our democratic civilization, for men of science to leave 'the public' out of account. If 'a little learning is a dangerous thing' for the individual, it assumes multiple proportions when the bulk of the community becomes infected. This business of popular education is in some respects a grand nuisance! It leads to a thousand blatancies—of bigotry, of cocksureness, of an assumed appearance of superiority without the reality, taking protean forms throughout the entire range of our public activities. Yet, on the whole, 'the greatest good to the greatest number' probably flows from just such an 'equality of opportunity'

* The anatomical fact alluded to might easily have been overlooked, but no knowledge of anatomy would have been necessary to a faithful record of *observed* fact. One of the ablest of our younger zoologists, and a college professor, when his attention was called to this curious statement of Mr. Burroughs, promptly replied in all seriousness, 'Perhaps he refers to the nictitating membrane'! Another zoologist humorously suggested that 'possibly the pineal eye was meant!'—but surely this hypothesis is barred by Mr. Burroughs's use of the plural.

† It is to be regretted, however, that Mr. Burroughs has brought *telepathy* into his animal psychology. See his article 'On Humanizing the Animals,' in *The Century Magazine*, Vol. LXVII., No. 5, pp. 773–780, March, 1904, especially pp. 776–777. One of the consolations of the comparative psychologist has always been his supposed freedom from the 'confidences' of the telepathists!

* See *The North American Review*, article cited, page 695.

as the diffusion of knowledge permits. All must be given a chance to breathe the fresh air, one must suppose, that the born 'saints' be not stifled; while, if 'saints' may be made, there must first be 'Christian Endeavorers' (to continue under the figure already borrowed from the editor of the *Atlantic Monthly*). Wherefore we still need our Mr. Mabies, even as our Mr. Mabies need improvement. We perhaps need even our Mr. Carl Snyders, but we certainly do not need our Mr. William J. Longs. We do need such delightful 'essay naturalists' as Mr. Burroughs; we need also professional naturalists who do not find it necessary to struggle against facts in order to develop or keep their individuality, but who try to make facts themselves attractive to both young and old; we need serious investigators in zoology and comparative psychology, who bring to their task 'an eye well practised in nature,' a mind exacting in its critical demands and furnished with a just knowledge of the results of previous workers, who are at the same time conscious of their obligation, as teachers, to a larger public. Above all, we need to-day, as much as ever, perhaps as never before, men whose attitude toward 'the people' resembles that of a Huxley or a Clifford, a Helmholtz or a Virchow, or that of many a lesser luminary, who by the popular exposition and inculcation of sound *principles* of science, have contributed effectively to the prevalence of light rather than darkness in the world, and, indirectly, at the same time, to the advancement of science itself.

And all these are needed (let it be stated whether *The Ypsilantian* thinks it 'nice' or whether it does not) in order that our children may be spared the painful necessity either of unlearning such pseudo-scientific fictions and anti-scientific prejudices as Mr. Long and his allies represent, or of growing up with minds perverted and ill adapted to survive as rational beings in a world of fact and law, though they struggle never so hard against both in the supposed interest of their individuality.

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SPECIAL ARTICLES.

THE ENCYCLOPEDIA AMERICANA ON ICHTHYOLOGY.

'THE Encyclopedia Americana,' now being published, is in some respects a meritorious work, but great carelessness has been manifested in some of the office editorial work. Such is especially the case in one of the articles of the last volume (Vol. VIII.) which has come to hand. The article in question is 'Ichthyology' and its author is President David Starr Jordan. The text is excellent but the illustrations are very badly identified and could not have been submitted to Dr. Jordan. We may imagine the surprise and disgust of the author when he finds the erroneous and strange names applied to more than half of the cuts. Those most erroneously named are the following in regular sequence (the pages are not numbered):

Homocercal tail.—It is the tail of a *Polypterus* and consequently not homocercal at all but diphycercal.

Port Jackson Shark (*Cestraciontes*).—This is not the Port Jackson shark but the bullhead shark of California (*Gyropleurodus francisci*).

Sting-ray (*Raia*).—No species of Raia is a 'sting-ray' and the figure does not represent what is generally called a 'sting-ray,' but a fish of a very different family, the *Aëtobatus narinari*.

Viviparous Perch.—The name is altogether too indefinite and misleading, inasmuch as it is very far from any true perch; it is the embiotocoid *Cymatogaster aggregatus* of California.

Elephant Fish (*Chimæra*).—Not the true elephant fish but the ratfish of California (*Chimæra* or *Hydrolagus Colliei*).

Gafftopsail Cat (*Galeichthys*).—By no means, but the common channel cat of the United States (*Ictalurus punctatus*).

Pike (*Lucius*).—The fish figured is not at all related to the pike and belongs to a different order; it is a barracuda (*Sphyræna barracuda*).

Butterfly-fish (*Holacanthus*).—Not related to *Holacanthus*, but the common *Zanclus cornutus* of the Indo-Pacific region.