Prussia and the empire together would form a fairer basis for comparison with the United States than would the empire alone, because the latter leaves the civil administration almost entirely to the individual states. The comparison with Prussia and the empire together, however, would not be exact, as in Prussia the nation assumes some functions which are here left to the states; but it is safe to say, that, if we could compare with accuracy the expenditures for like purposes in Prussia and the empire together and in the United States, it would be found that the proportions in each of war expenditures were nearly the same; and of course, if we consider the *productive* expenditures of the German states, the percentage of war expenditures will be much smaller than in this country.

I do not mean to deny Mr. Atkinson's general statement that a larger proportion of expenditures goes for war purposes in Europe than in the United States, nor to underestimate the other burdens which a great standing army imposes, but merely to point out, that, so far as state expenditure for war purposes is concerned, the difference between this and other countries is not so great as we are apt to think, and that in the case of Germany it is doubtful if whatever difference there may be is in our favor.

Mr. Atkinson also holds "that the revenue of state forests, mines, and other instrumentalities of subsistence . . . constitute as true a tax upon the people as if they had been assessed directly on their property."

That is a question that ought to be determined before we begin to make comparisons. If we intend to count profits from lands, mines, and railroads as taxes in Europe, we must do so in this country.

If the consumer is served equally well and cheaply by a private and public producer, profits are no more a tax in one case than in the other. It would be difficult to convince any one that it makes no difference to the German tax-payer whether governments derive from the profits of railroads a revenue sufficient to pay the interest on the public debts, as is the case in the German states, or whether that revenue comes from taxation, provided the railroads are as well managed as they would be if government did not control them.

HENRY B. GARDNER.

Johns Hopkins univ., Baltimore, March 21.

The characteristic curves of composition.

With regard to Professor Mendenhall's novel paper on 'The characteristic curves of composition,' in your issue of March 11 (No. 214), which proposes to represent and compare the orthographical productions of writers by a statistical and graphical method, it seems to me, that, interesting and instructive as are the results he has reached, they are confined to a range of inquiry too narrow to bring into sufficient relief the personal idiosyncrasies of individual writers, and to a kind of enumeration in which personal peculiarities are too much marked by the particular language in which they write.

That the characteristic curve is principally controlled by the language in which the composition is written, is evident from the comparatively small difference to be found between the various English writers between whom comparison is made, as well as from the marked departure from this general shape of the English curve to be seen in that of Caesar's 'Commentaries.' The curve found for any other Latin author would presumably not differ from this one more than the curves of various English writers differ from each other.

What the general shape of the characteristic curve may be for any writer is determined, then, principally by the language in which he writes.

It would be interesting to compare several languages with each other, so as to obtain approximately the normal curve for each. An inflected language, like Greek, Latin, or German, will, of necessity, have its normal curve largely affected by the numerous letters forming the terminations. Moreover, any tendency toward the formation of compound words, such as *Pferdebahnwagon*, or toward agglutination, would also have its effect upon the shape of the curve. Such a comparison would doubtless furnish tests on which to build new arguments and comparisons respecting the vexed question of Teutonicity, and the like.

But to return to the point with which I began; viz., that there are other characteristics of writers equally susceptible of treatment by the statistical and graphical method, in which their personal peculiarities differ more widely, and which are therefore more characteristic than the habitual selection and use of long or short words. For example: it seems to me that the length of the sentences employed by a writer is such a peculiarity, and one which, although influenced somewhat by the particular language in which he writes, is nevertheless an expression of his habits, feeling, taste, and individuality to such an extent as to exhibit necessarily some characteristics which would distinguish him in a marked manner from other writers.

The length of the adjective modifiers of substantives seems also to be a particular well suited to bring out individual characteristics by a similar enumeration. In this category may be mentioned also the length of the adverbial expressions; the complexity of the verbs; as well as the character of the vocabulary as regards derivation from Anglo-Saxon, French, Latin, Greek, etc. The list of fit subjects of enumeration can be extended at will.

It would seem probable that a discussion of the results obtained by the simultaneous application of several of these enumerations would, in any case of disputed authorship, afford decisive tests such as could not be obtained from any one of them singly; and by its help the person making the investigation could exhibit to the public how weighty the evidence may be on which his judgment is based.

H. T. EDDY.

Cincinnati, March 14.

Earthquake weather at sea.

Your European exchanges have no doubt given you so full reports of the recent earthquake in this region, that it would be impossible for me to add any thing that would interest you or your readers. You may be interested, however, to have somewhat in as detail a report of earthquake weather at sea, such was encountered by the steamship Gottardo on its last trip from New York.

We sailed from New York on the 19th of February, and had disagreeable weather almost from the hour we left Sandy Hook. On Tuesday, the 23d, began a series of storms which kept by us almost constantly until we sighted the African coast outside the Straits of Gibraltar. The disturbance began about 4 P.M.

on that day, when we were in latitude 37° 32′ north, longitude 51° 26′ west of Greenwich. At that hour the barometer fell to 29.33; and the wind, which had been in the S.E., suddenly veered round to the S.W. and W. It increased in intensity very fast, and in an hour was blowing a whole gale, fully 70 knots an hour. The direction of the wind during this change was successively S.E., S.S.W., S.W., W., N.W., and N.N.W., and during the next twenty-four hours it was shifting back and forth from S.W. to N.N.W., with frequent squalls of hail and rain and a very heavy sea. The gale subsided the afternoon of the 24th, and the wind subsequent to the disturbance was quite steadily from the N.N.W.

The weather continued to be cloudy and squally, with frequent hail and rain and heavy sea; the barometer continued very low, and the wind strong from the N.N.W. and W.N.W., until the 27th, when the wind veered to the W. and S.W., and remained in that quarter until the Azores were passed.

Early on the 1st inst. the wind shifted to the S.E. and E., with strong and heavy sea, and remained a steady head-wind, with cloudy and squally weather, until we were within a hundred miles of Gibraltar, the night of the 4th inst. At Gibraltar we learned of the earthquakes hereabouts and in the south of France, and were satisfied, that, if we had escaped the shock of the earthquake, we had had our share of earthquake weather. How far experienced observers may be able to connect our remarkable atmospheric disturbances at sea with the almost simultaneous quakings on land, I will not venture to suggest, but leave with you the record as it was made up at sea before we knew any thing of what was taking place on land.

At Gibraltar we learned that the western Mediterranean had been exceedingly stormy during the week following the earthquake, and it will probably be found that the atmospheric disturbance corresponded closely with that which we experienced at sea.

HENRY D. HARROWER.

Genoa, Italy, March 9.

Notes on the diet of amblystomas.

All this past winter I have kept, in a little water in a small covered tin can, a large adult specimen of Amblystoma mavortium. Upon several occasions he has had the water about him freeze perfectly solid; and by accident he once remained in this condition, firmly fixed in the clear cake of ice, for a period of forty-eight hours. When spring came about, I removed him to a large and comfortable glass jar, with a heap of rocks in it for him to come out of the water and rest upon.

As he had not eaten any thing whatever for nearly five months, it struck me that he might have a good appetite for some raw meat. My suspicions were fully confirmed, for he ravenously devoured five pieces of lean beef in rapid succession, each piece being about as large as an ordinary lima bean.

Next day I could not get him to touch any thing, nor could he be tempted by the most delicate morsel of raw beef on the second day after his feast. The third day he seemed to me to be rather uneasy; and, believing him to be hungry again, I offered him a nice little piece of lean and raw mutton, as I had no beef. He at once snapped at it eagerly, taking the entire piece in his mouth. It was not there more than a fraction of a second, however, when his eyes began to roll in his head with a peculiarly horrified expression; and with a disgusted effort he immediately ejected the morsel of mutton again, and then took to spitting and gaping in a way that I never saw him guilty of before. There was no doubt in the world but that he was hungry; my several renewed efforts, however, to get him to eat the mutton, all failed.

So far as this individual specimen is concerned, he undoubtedly has a great aversion to that kind of meat, and it would be interesting to know whether this is merely 'a personal idiosyncrasy,' or whether it is universally the case. R. W. SHUFELDT.

Fort Wingate, N. Mex., March 14.

Old maps of the Great Lakes.

In looking over (for other purposes) some of the old maps in the congressional library, I have been struck with the confusion of ideas which seems to have prevailed among the early geographers on the subject of the drainage of the Great Lakes. Tracings of several are before me. One marked conjecturally on the original 'ab 1690' shows 'Lake Erius or Felis' connected by a good broad natural canal with the Potomac, which is represented as rising, at farthest, not much above the site of Washington. This is the harder to account for, inasmuch as the river-bank below, and the adjacent shore of Chesapeake Bay, were evidently well settled. Port Tobacco, Bristol, Calverton, St. Mary's, Arundelton, and Whitehall make a good sprinkling of villages, most of which have changed their names or passed away altogether; but a little beyond them all is twilight, with its illusions. So far as one can make out, the Anacostia or eastern branch is given the work of lake-drainage.

On a map of the world published in 1670 by Thornton of London, the Mississippi takes its rise in 'Grand Lake,' evidently Lake Superior. A map of America 'ab 1685' makes Lake Ontarius the source instead; and there is yet another, of which I made no note, that represents Lake Erius as discharging in the same manner and direction. All or nearly all of these geographers were aware of the St. Lawrence and its relations to the lake system, but they believed in a double drainage in very different directions.

A map ('ab 1690') of "New England, New York, New Iarsay, Pensilvania Maryland and Virginia, sold by Iohn Thornton at ye plass in ye minories" and others, is generally correct as to the outline of Chesapeake Bay and the tide-water part of the Potomac, but above the Little Falls it takes the name of Turkey Buzzard River. At no very great distance north of this point, this stream rises amid figures of trees and hills, with wild animals in the distance; but 'Lake Erius' is not called in to assist conjecture.

WM. H. BABCOCK.

Washington, D.C., March 10.

A meteorological inquiry.

Why do the winds at Denver blow either north or south nearly fifty per cent of the time, coming from the north during the day, and from the south by night? The record for 1884 shows twice as many south winds as north, but two observations are made at night to one during the day. H. A. HOWE.

Denver univ., March 2.