present arrangements, is impracticable, as no volume of proceedings has been issued in recent years under ten or eleven months. This year it is twelve. Let such papers then be printed in quarto form under the title of 'memoirs' (a series already commenced), and issued one by one as fast as printed: even with this elimination and restriction, the volume, with the growth of the society, will become quite as large as should be issued by the association with its limited funds and its liberal rules of distribution. The members would receive an acceptable *quid pro quo*, containing a fair statement of the work of the association and the industry of its members. Such an action would, as it should, elevate the presidential addresses to a higher dignity; while, more important than all, it would free the association from a heavy monetary burden, and enable it, as it otherwise could not, to devote a not unimportant part of its annual receipts to annual subsidies for special research. The association would thus be enabled to take the place that belongs essentially to it — of fostering 'the advancement of science' in the most effective manner.

ANOTHER EVIDENCE of the necessity of restriction, in expenses of astronomical establishments, comes from abroad. In his last report, Admiral Mouchez, director of the Paris observatory, noting the fact that the publication of the *Bulletin astronomique* entails great outlay of the resources of the observatory, expresses his apprehension, that, unless the list of subscribers to the periodical is largely augmented, the journal must soon be discontinued. *Bulletin astronomique* is a monthly of the highest value; and, although very young, it would be greatly missed. The first number was that issued for the month of January, 1884.

LETTERS TO THE EDITOR.

**** Correspondents are requested to be as brief as possible. The writer's name is in all cases required as proof of good faith.*

Meteoric activity, Aug. 10.

ON the 10th of August last, the date of meteor activity, it was noticed about ten o'clock in the evening, that meteors issued very frequently from the constellation of Perseus. They increased in number hourly, until about two o'clock in the morning they attained their maximum frequency, which was about one hundred and fifty every hour. After this the number per hour grew less frequently until four o'clock in the morning, when they fell, as in the early evening, about fifty each hour. The majority of meteors were of the third and fourth magnitude, and from two to three degrees in length. The finest meteor of the evening issued from the constellation Perseus, took a north-westerly course, and disappeared behind the horizon. It was of the first magnitude, and silvery in color. The passage of the meteor was marked by a train resembling steam, which did not disappear for over a minute. Many other meteors were observed during the evening, but all were less brilliant than the one described. Two were seen directly south, and a few south-west; but the majority issued from the constellation of Perseus.

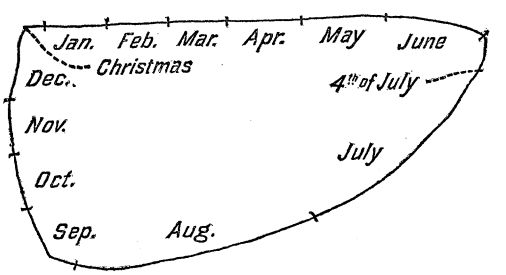
DARWIN MYERS.

Fort Wayne, Ind.

Color associations with the months.

Noticing in *Science* of July 31 a letter on 'color associations with the months,' I would call attention to a geometrical association that I have unconsciously acquired, and that is ever present in my mind when thinking of any date, or period of the year. The curve is represented in the subjoined sketch. The divisions represent months. Several, as you observe, appear longer than others. The plane in which this curve is described appears to me inclined at an angle of about 40° with the vertical. Its longest diameter is perhaps two hundred yards. From day to day I seem to move along this imaginary line to positions corresponding with the date.

Notable days, as Christmas and Fourth of July, stand out as distinct marks in the curve. It appears, not as a black line, but as a portion of space only

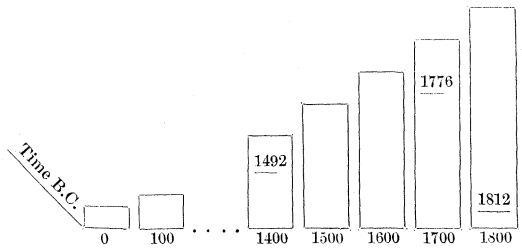


defined by marks here and there denoting days on which something occurred that I remember. My supposition as to the origin of this unnatural and rather unpleasant notion of the months, is, that, when a child at school, the impression made upon my mind by my every-day duties was similar to the emotions one would feel in walking around a curve arranged as this is. Entering school the middle of September, there was, until Christmas time, hard, up-hill work. Then for one week, until Jan. 1, a period of rest, after which things would go easier by my being accustomed to them, and looking forward to the spring. During June the curve begins to bend down; and, through July and August, there is perfect rest, as though one were sliding down with no exertion, until towards September the thought of again assuming the duties of school-life puts a stop to the downward motion, and the curve begins to ascend in September. On this supposition it is hard to explain why July and

August are so much longer than the other months. This impression of the months applies only to the current year.

When thinking of any event that occurred more than one year ago, I have an entirely different scheme presented. The second figure illustrates it. The centuries are arranged in columns, decreasing in length until the Christian era, beyond which the lapse of time is denoted by an inclined line here shown.

Important dates I think of as lines crossing these columns; and the life of a noted man, or a war, as the space included between two such lines.



I should have said, that in these columns the decades are marked by especially distinct lines. It seems to me there is in these mental associations a large and interesting field for study; and I, for one, would be glad to hear other facts bearing on the subject.

C. RUHEIT.

New Haven, Aug. 6.

The classification and paleontology of the U. S. tertiary deposits.

In the issue of this journal of June 12, Prof. A. Heilprin condemned the second part of my article on the genealogy of the tertiary mollusca of the United States *before* it had been published. Since its appearance, moreover, he has again recurred to the subject in a note in *Science* of July 31. I would here beg permission to defend myself from the charges that he brings forward.

I have shown that the literature affords no evidence, either paleontological or stratigraphical, that the Vicksburgian is the most recent formation; and have given a number of reasons, based upon profiles which I have observed, showing that this bed is most probably the oldest. Professor Heilprin, however, has nothing whatever to say on these subjects. What, then, does he say?

1. "It might appear . . . that the paleontological evidence was in conflict with that derived from stratigraphy. As a matter of fact, however, the paleontological evidence . . . is, as we now know it, absolutely confirmatory of the pregnant facts which the stratigraphy of the region presents; and, indeed, it would be difficult to find a region of similar deposits where it is more so." When he wrote this, Professor Heilprin must have entirely forgotten what he himself had published on the fossils from Wood's Bluffs, (Proc. ac. nat. sc. Phil., 1880, 364–375). There he points out, in spite of certain wrong determinations, clearly and in extenso, the conflict between paleontological and stratigraphical evidence (see pp. 368, 369).

2. "The absence or scarcity of forms of a distinctively old-type facies in the Vicksburg beds, and the introduction there of new forms whose equivalents or immediate representatives are known only from the newer horizon, are sufficient in themselves to establish the position." This statement of Professor Heilprin is new and wholly without proof. My studies lead me to precisely the opposite view. In the Vicksburgian are contained the old forms, while in the Claibornian the new ones make their appearance. The facts upon which I base this statement will be given in another place.

3. I have contested the right to consider and map all localities with Orbitoides as oligocene. Professor Heilprin objects to the older authorities, hence I will here quote the following very recent one. Zittel's Handbuch, vol. i., Munich, 1876–80, p. 103, says, "Orbitoides . . . In der obersten kreide, sehr verbreitet im eocän, im miocän selten." If Professor Heilprin can cite any authority, stating that Orbitoides occur only in the oligocene, I shall be very glad to have him do so.

4. Then Professor Heilprin speaks of Zeuglodon. He argues, Zeuglodon is 'leitfossil' for the Jacksonian; it is known in Europe in late eocene or miocene deposits, hence the inference is that the Jacksonian must be late eocene (or miocene?); the Claibornian is middle eocene (Parisian), consequently the Jacksonian overlies the Claibornian. To give to this argumentation some weight, it will be necessary for Professor Heilprin to prove: *First*, That Zeuglodon occurs only in the Jacksonian, and not elsewhere in America. Having studied the known *facts* which have been published, and having myself seen and collected Zeuglodon at different localities in the South, I have as yet not found evidence to convince me of the truth of this statement. *Second*, That he has a right to parallelize the Jacksonian with any European bed from the presence of a single genus. I found a small bivalve in Jackson, which I should compare with specimens of the genus Kelliella, Sars. If, however, a genus (not a species) can be determined from figures and descriptions alone, there can be no doubt that this fossil belongs to this genus, hitherto only known as recent (and pliocene?) in Europe. Has any one a right to draw from this the conclusion that the Jacksonian bed is recent or pliocene? *Third*, That the Claibornian is middle eocene. My studies and comparisons have demonstrated to me that it would be a laborious and difficult task to parallelize the sub-divisions of the American old-tertiary with those of the European. So far as I am aware, my material for this purpose exceeds that of any other collection. Hitherto I have ascertained nothing to prove that the Claibornian is middle eocene, although it may yet be proved. If Professor Heilprin can prove two of these three-mentioned points, without the third one, there will be nothing convincing in his argument 'to the mind of any unprejudiced paleontologist.'

5. "In that which relates to the oligocene (Orbitoide, Nummulite) rock of Florida, whose existence appears to give Dr. Meyer a considerable amount of anxiety, and which would better suit the requirements of the new theory were it cretaceous, our author need entertain no doubts. The rock is there," etc. I have not the least doubt about the existence of orbitoidic limestone in Florida, observed by E. A. Smith, nor have I anywhere expressed such. This limestone causes me no anxiety whatever. I fail to see why this limestone, if Vicksburg is the oldest bed, should be cretaceous. I have nowhere expressed this belief, nor do I think it will prove to be of this formation. All that I have said is, that there is no reason to map as oligocene localities where orbitoidic limestone is observed, or the larger areas, where nothing at all has been observed.

6. "In such inquiry, it is necessary, however, to