20 seconds, with a series of small north and south oscillations. My daughter, who was sitting in the second story of my house, at the same time (as proved by her mantel clock) felt the floor quiver, and heard the windows rattle. As the explosion, according to the New York papers, occurred at 11.13 ± some uncertain number of seconds, and as the seismoscope registered no other shock between 11.00 and 11.20, when traffic was resumed, there can be no doubt that we caught the explosion wave, which was much more vigorous than I had expected, at a distance of fully 50 miles. I suppose we did not get the beginning of the disturbance, which probably began gently and rose to a maximum like any other earthquake.

The delay of 13 minutes at New York was very unfortunate, and caused the total or partial loss of many valuable observations. One cannot suppose that it was intentional; but it put all other observers at a great disadvantage, as compared with those of the engineer corps, who received a telegraphic signal from the firing key. The officers in charge, knowing of the elaborate preparations made for observations along other lines than the two occupied by their own men, ought to have taken great pains to prevent it.

C. A. YOUNG.

Princeton, N. J., Oct. 12.

False report of the fall of a meteorite in western Pennsylvania.

On the afternoon of Saturday, September 26, at a little after four o'clock, loud detonations were heard over a considerable area of western Pennsylvania, and circumstantial reports were subsequently given in the press of the fall of a large meteorite, which was described as being half buried in the ground and visited by numbers of people. On examination, these latter reports appeared to me to be unfounded, and I should have given the matter no further attention but for the numerous inquiries which are being addressed to this observatory with requests for specimens. To settle the question, I sent a competent observer, Mr. J. E. Keeler, to the scene of the alleged fall near the West Virginia boundary in Washington county. After an investigation on the spot, he finds that no meteorite has been found. A meteorite undoubtedly passed over, and was seen by Mr. Buckston and others to burst in a southerly direction from the town of Independence. The report, according to Mr. Buckston, was heard a minute or more after the explosion was seen, and from this and the apparent height at which he saw the meteor burst, Mr. Keeler infers that the actual explosion occurred twelve or fifteen miles to the southward, when the meteor was still two or more miles above the earth. In spite of statements to the contrary, no fragments are as yet known to be found.

S. P. LANGLEY.

Allegheny, Oct. 7.

Spectrum of the great nebula in Andromeda.

A week or two since, the finding of bright lines in the spectrum of the great nebula in Andromeda, found place in your columns. Since then by the aid of the spectrum of β Lyræ and γ Cassiopeiae certain results have been obtained.

The line described in the last notice as crossing the spectrum is H β, and is due to the brightening of the aurora as a whole.

The two lines described as appearing as bright knots have wave lengths 5312.5 and 5594.0. Thus agreeing well within the limits of error with 1250 +20 and 1474 of the solar corona, lines which are also found in the auroral spectrum, and in the spectrum of a solar protuberance (Schellen. 2.136).

In spite of the uncertainties natural to the observation and identification, the resulting suggestion of a similar origin for the light of the new star is not without considerable interest. O. T. S.

Yale college observatory, Oct. 5.

Science in common schools.

Your notes on teaching science to children need qualifying, so far as inference is concerned. The boy of nine years was evidently badly managed, but a boy of nine with a good head is capable of comprehending physiology, botany, geology, biology, if properly taught. The chief difficulty with the case in hand was that his information led to a cuteness of intellect. He would be set down for a 'smart' boy. Of all the text-books for the young the one that best suits me is Shaler's 'Geology for beginners.' This I have allowed my nine-year-old to use during the past summer. He has talked over each chapter with me, and we have discussed matters as if both were boys, using simple words, but no tricks of illustration, such as your boy seems to have been indulged with. Occasionally he has been exercised in an attempt to tell the contents of a few pages where these together make one picture. In no case has he verbally memorized, except to clearly comprehend the division of protozoa, mollusks, articulates, vertebrates, and that of orders, species, etc. Having once finished a chapter, we reviewed it to call out new points and illustrations. This book has been his story book; he will not read an ordinary story when such material is at hand. To say he fully comprehends the theories advocated by Professor Shaler is not to say too much. As he is four-fifths of his time out of doors or working with his tools, it has been easy to make the soil and the stones under foot illustrate his book. Now, if any one will write as good a biology, the nine-year-old shall have that next; then botany and physiology. I am suspicious of pen-work at this early age. It is a precocious, unnatural cramping of a boy's knowledge into formal artistic shape. It involves the art of expression and the art of restraint, or a skill in leaving out as well as putting in. The boy would best be left to talk the subject over in free language.

But when shall pen-work begin? Later; at about about twelve years or fourteen. Then let the lad have a portfolio and write something on any topic he is thinking about each day of his life. Nothing spoils a mind so quickly as composing, as nothing so assists if wisely managed. I should decidedly prefer that the first efforts of composition should be in the dramatic form. Let him set his characters talking, and put in their mouths the notions he has of them. For instance, Garibaldi, King Victor, Cavour, Louis Napoleon, or President Cleveland and his cabinet talking over the Indian question. Contemporaneous history being his regular historical study, his characters should be living characters, or mainly so.

The composition on iron ores is, however, a most excellent specimen of descriptive writing for a very

young pupil. It is, I take it, by a girl, though your article says a boy. But is there much real value in the exercise even when such clearness is attained?

I make it a conscientious matter from the first to answer all child questions about nature in a truthful manner. They are never put off with false theories involving supernatural or other agencies. For instance, what child fails by three to five years of age to ask how do the stars stay up there? How easy to put him off with some farcical or miraculous supposition. On the contrary, the simplest possible attempt should be made to give him the real explanation. Will he understand it? If not entirely, he will be on the right road. There will not be something to undo by and by. Why can he not understand attraction as well as you or I? Only he must have it explained by what he is familiar with.

We are getting on the right track. Science furnishes studies infused with romance. No novel has the fascination for young people of a well-told geology or biology. E. P. POWELL.

The care of pamphlets.

Every scientific library, public or private, contains pamphlets by the thousand, and nothing is more necessary for the accommodation of those who use it than some available system of binding which shall preserve from destruction and at the same time be accessory to a convenient system of classification.

Some system of permanent individual bindings is needed which shall afford 1°. permanent protection; 2°. the possibility of a perfect classification, and the intercalation of new material from day to day; 3°. opportunity for perfect labelling and cataloguing; 4°. the greatest convenience to the reader. The best endowed public libraries can perhaps afford to pay a bookbinder to put separate covers on pamphlets, and it is the practice of many of them thus to care for the most important. The cost is, however, very considerable. What the private individual needs is a binding-case much more inexpensive—one in which he can himself insert his pamphlets. Feeling sure that it was possible to meet this need, I undertook an investigation. The bookbinders, with their skilled workmen and their expensive binder's board, did not seem to be in a position to supply this demand. I found upon inquiry that the simplest form of binding-case cost from twelve to fifteen cents. I next turned to the paper-box manufacturers, who employ unskilled laborers, and who use less expensive materials. I found that binders for octavo pamphlets, when ordered in considerable quantities, could be made for $4.50 a hundred, and quarto binders for $7.50 a hundred. These binders are made with sides of thick paper-pulp board, which is not likely to warp, and with backs of binder's muslin, and are covered with binder's paper. They have muslin stubs, upon which the pamphlets may be glued, and may be made of varying thickness. The most useful sizes will doubtless be one-eighth, one-quarter, one-half, three-quarters and one inch. The sizes I use are, octavo, 6 3-4x10 inches; quarto, 10x12 inches. The octavo covers are made larger than the ordinary octavo page, to include papers in imperial octavo; duodecimo pamphlets may also be put in these covers, for the sake of uniformity, and convenience in classification. Each binder has a blank label on one of its upper corners, upon which the name of its contents are written. I arrange these in paper boxes, upon ordinary book shelves, so placed that the contents of each box may be handled in the same manner as the cards in a card catalogue, the position of the title labels facilitating this operation. A system of deep drawers would be equally convenient.

I also use these pamphlet-cases for filing letters, photographs, newspaper clippings and other literary material. A stout manilla envelope being glued to the stub with its opening to the right, and next to the back, is covered and protected by the sides of the binder, and may be filled with loose papers, their character being indicated upon the label outside. The binder may then be arranged with the pamphlets or elsewhere. Classified scrap-books may very easily be made by fastening a few sheets of book paper to the stubs, and bundles of letters may be bound in in a similar manner. I have for years used binding-covers of a still cheaper and simpler form, which are simply sheets, 9 1-2x13, made of the stout, thick paper used in herbaria for genus covers. These are fastened to the pamphlets by the use of the patent staple-like paper fasteners, sold by stationers. They are labelled and arranged in the same manner as the binders, as described above, and serve an excellent purpose, the paper, though less indestructible than is desirable, being very stiff and durable. It is simply waste of time to use even the thickest of ordinary manilla paper for this purpose.

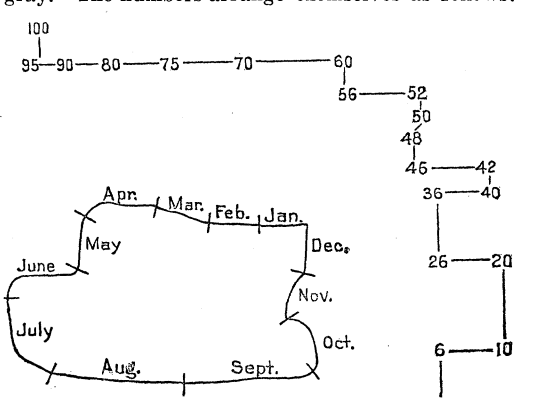
This note is sent in the hope that it may draw forth descriptions of other methods of caring for pamphlets. G. BROWN GOODE.

U. S. national museum, Washington.

Color and other associations.

In *Science* for the 18th of September, I was much interested in the letters on 'color and other associations,' for I have always experienced similar illusions. According to my fancy, the months have always appeared as below.

The days of the week are in the form of a circle, Sunday on top, Thursday below; the days rotating from right to left. Sunday appears yellow, Monday pale straw, Tuesday green, Wednesday yellow, Thursday orange, Friday black, and Saturday whitish gray. The numbers arrange themselves as follows:



When I think of a number I always place it in the diagram. Above 100, the numbers go between the hundreds like the diagram, and the hundreds themselves follow a similar course.