Mr. Editor :—1. On page 100, of the JOURNAL, are two mistakes: $(3+2)\times(5+7)=60$, not 175; $(9-2)^2=343$, not 243.

2. Under the heading "Division of Fractions," on page 101, four quantities are represented equal; viz, $\frac{3}{4} \div \frac{4}{3}$, $\frac{3}{4} \div 5$, $\frac{7}{15}\times 7$, and $1\frac{4}{5}$. The second of these is not equal to either of the others, since $\frac{3}{4} \div 5$ is not 7 times $\frac{7}{15}$ as represented, but $\frac{1}{7}$.

This method of indicating work is often employed to save time and labor—two things very valuable in themselves, which ought not to be saved, if the result is to be the loss of accuracy.

3. My explanation of the division of $\frac{3}{4}$ by $\frac{4}{5}$ is this: Since the quotient obtained by dividing a number by x is the number itself, $\frac{3}{4} \div 1 = \frac{3}{4}$. Since any number must contain seven times as many sevenths as ones, $\frac{3}{4} \div \frac{1}{7} = \frac{3}{4}\times 7 = \frac{21}{4}$. Since a number can contain 5 times a number only $\frac{1}{5}$ as many times as it contains that number, $\frac{3}{4} \div \frac{5}{7} = \frac{3}{4}\times 7 \times \frac{1}{5} = \frac{21}{20}$.

4. Are the expressions "7 times too large" and "7 times too small," used in the explanation printed last week, correct? The former was used to express the idea that the divisor used was 7 times as large as that by which we were to divide, while it expresses the idea that the divisor used was 8 times that by which we were to divide. P. N. M.

[We think these expressions correct.—ED.]

Mr. Editor : — In my teaching I find the following example: What is the present value of $2880, \frac{1}{4}$ payable in three months, $\frac{1}{4}$ in six months, and the rest in nine months, at 6 per cent per annum? Now, my class find that by equating the time of payment of the several sums and then finding the present worth of the $2880 for the equated time, they obtain, for an answer, $2809.75 + ;$ but if the present worth of the several sums is found separately, and these results added together, they obtain $2810.07 +.$ They ask me which is right, and how shall I explain the difference? Please publish this, and ask for an explanation, and you will oblige
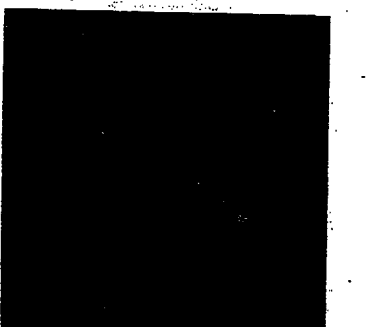A PEDAGOGUE.

[To determine what sum of money put into my hands now will be worth to me at any future time, the same as certain other sums due in the future, will depend not only on the rate of interest I can get on my money, but also how often the interest is to be paid. By working this problem in these two ways, you vary these conditions, and therefore get different results. Both are right, if you admit the conditions.—ED.]

Mr. Editor :—Notwithstanding the positive tone of a late correspondent, there is no uniform rule in arithmetic for solving such an example as $2+8\times6=$? Any teacher who has a wide acquaintance with the different arithmetical text-books, knows that the answers to examples of this description vary according to the text-book used. In algebra, however, the system of notation is invariable; a term is bounded by the sign $+$ or $-$, and $2+8\times6$ can only equal 2, increased by $8\times6=50$. Why should not the usage that is universal in algebra prevail as well in arithmetic? It seems absurd to teach the pupil that $2+8\times6$ may equal 60 in arithmetic, but must equal 50 in algebra. L. D. L.

[It not only *seems absurd*, but it is absurd. The rule is as universal in arithmetic as in algebra, and nobody who has any good claim to be called a mathematician ever varies from it.—ED.]

PONS ASINORUM.

[In a personal interview with Gen. James A. Garfield, Member of Congress from Ohio, we were shown the following demonstration of the *pons asinorum*, which he had hit upon in some mathematical amusements and discussions with other M. C.'s. We do not remember to have seen it before, and we think it something on which the members of both houses can unite without distinction of party.]

On the hypothenuse cb of the right-angled triangle abc, draw the half-square cbe. From e let fall the perpendicular ed, upon the side ac produced.

The triangles abc and dce are equal; the side $ab = dc$, and the side $ac = de$.

The area of the quadrilateral $adbe$ is measured by its base ad, multiplied by half the sum of its parallel sides de and ab, or $ad \times \frac{ab+de}{2}$, which is $\frac{ac+ab}{2}$.

But the area of the quadrilateral $adbe$ consists of half of the square of bc plus the two equal triangles acb and dce; or $\frac{cb^2}{2} +$ $ab \times ac. \quad \therefore \frac{cb^2}{2} + ab \times ac = \frac{ab+ac}{2}; \text{ or } cb^2 + 2(ab\times ac) = ab^2 + 2(ab+ac)+ac^2. \quad \therefore cb^2 = ab^2 + ac^2.$ Q. E. D. [J. A. G.

Correspondence, Notes, and Queries.

Spelling.—Time Well Spent.

To the Editor of The New-England :

I am often instructed by valuable information imparted through the column of "Notes, Queries," etc., and sometimes amused by the theories advanced therein. Under the heading "Amusement," I should be inclined to place the article under caption, "Spelling —Time Misspent," in your issue of March 4, by your correspondent "H.," who evidently has a theory, and shows to what extremes theory as to the introduction of a new system of teaching in our schools may be carried, in the article referred to.

I was convinced, upon reading "H.'s" communication, that he is not a teacher, but probably some committee-man whose theory has got the better of his discretion, and so he has allowed his ideas on the subject of teaching spelling to appear in print. He says, "Could I have my own way I should forbid the use of not only the spelling-book, but of spelling as any regular exercise," and would introduce readings from such works as "Parent's Assistant," "Robinson Crusoe," etc. I should like to ask "H." how long he has found it necessary, by his experience, for children to continue the study, or rather the reading of "Robinson Crusoe" in order to become good spellers. The absurdity of such a method must be apparent to every experienced teacher in the country.

I will, however, give "H." the credit of consistency, as his views in the same article, on teaching arithmetic are very much in keeping with his theory in the method of teaching spelling. How long would a teacher sustain himself, who should attempt to keep children at slate-exercises in addition, subtraction, multiplication, and division, until the age of 12? The average age of the children of the Junior Intermediate Department of the school under my charge is ten years, and I find that they have a very thorough knowledge of the principles of the four fundamental rules of arithmetic, and therefore I do not think it would be expedient to adopt "H.'s" plan, and continue the study of the first principles for two years longer.

It is not my intention to provoke controversy by this reference, but would rather attract attention to *notions* often entertained by those who would be educators, school officers, and in too many instances are school officers, who do not seem to have any practicable idea as to what books should be used and the best methods of teaching grammar, spelling, arithmetic, etc., than "H." has evinced in his communication; hence the necessity of having an experienced superintendent at the head of every school board, that our schools may be protected from inferior and insufficient text-books, as well as superficial instruction.

Of the different methods of teaching spelling that I have followed, I find that written spelling-exercises give the best results. A *pronouncing* speller should be used by the class; Worcester's is one of the best. My plan is as follows: I give my class a lesson, in length, according to the character of the words, from which I select twenty-five, and dictate them to the class, who write them in a book, published by Potter, Ainsworth & Co. Trusty monitors collect the book at the close of each exercise, and mark the errors. On Thursday, at the close of the school, the name and number of errors made by each pupil during the week is placed upon my desk. On Friday I require those pupils who have misspelled words to write them correctly in the blank book in a column provided for that purpose, and then learn the words on which they have failed, so as to be able to repeat and spell them orally without dictation by me. Those who have been perfect in the written spelling exercises do not have any lesson on Friday. I find by experience that the plan works well, and therefore can recommend it. W. E. P.

"Had Rather."

What "L. D." (JOURNAL, Feb. 19) says of the origin of *had rather* is plausible on the face of it, but unfortunately there are no historical grounds for it. *Had rather*, like *had better, had as lief, had liefer (lever)*, etc., is good old English, and it is merely ignorance that has led modern grammarians to condemn it. *Would rather*, etc., are well enough, but the older and more idiomatic forms are as good, if not better.

In these idioms, *had* has become established as a kind of auxiliary. Maetzner, in his "English Grammar" (English translation, vol. iii, p. 7) says that "*have* takes in many relations the pure infinitive"; and he adds, "This happens if *have* is accompanied by *good, better, best, lief (liev), rather*, and has a notion of an activity as an objective determination." He also says, "The idea that *had* is corrupted from *would* needs no confutation."

That it is the *infinitive* that is joined to *have* in these expressions is shown by the fact that the sign *to* is sometimes found, as in Shakespeare, "Merchant of Venice, *i. e.*, "I had rather to be married," etc. The *to* is omitted in some of the modern editions, but is found in the folio of 1623. In early English this was more common. Thus in what is often called "the first English book," Mandeville's "Travels," we find "Hadden lever to gon by londe."

Some writer (I forget who) has tried to explain these forms by reference to the familiar use of *have* in *I have to study hard*, etc. *I had rather go than stay ; I had (have) to go rather than to stay* I doubt whether the one idiom has grown out of the other, but the one is certainly no more peculiar than the other.

Of the forms in question, *had lief*, or *had liefer* (or *lever*) is apparently the oldest, and is, as we have seen, in the earliest English books. It is common in Chaucer and the writers of his day. It survives in our *had as lief*, which, by the way, occurs often in Shakespeare—oftener than *had rather*. The latter is found in Milton (as in "Paradise Lost," vi. 165) and in standard English writers generally down that day to this. Cowper's,

"I had much rather be myself the slave,
And wear the bonds, than fasten them on him,"

is familiar to everybody. I am not sure that Tennyson has *had rather*, but he has *had lief* in the "Idyls of the King," in a passage which I have not leisure to look up. I doubt, indeed, whether *would rather* is to be found in *English* writers (as distinguished from *American*), unless in some very recent ones. If the propriety of *had rather* has been questioned on the other side of the Atlantic, I should be glad to know by whom; or if an example of *would rather* (for *had rather*, and not as the expression of a wish, like *would rather I were dead I*) can be found in any English author earlier than the present century, I should much like to see the passage. My own impression is that *would rather* is a Yankee neologism, like *the house is being built* for *the house is building*,—got up, like that, to correct a supposed error of syntax.

Lief is an old adjective, meaning *dear*, the *leaf* of Anglo-Saxon, *Hulliwell* (q. v.) though, has "those who are most leife and deere unto us." In the old play of "Gamma Gurton" (A. D. 1551?), we find "Who was it liever son?" Spenser (like Chaucer, and other earlier writers) uses it as a noun, for love or lover, as in the "Faerie Queene," *i. e.*, xi: "to be her liefe." The comparative *liefer* (or *liever*), is also found as an adjective; as in Gower's "Conf. Am. iii."

"The leef full ofte for the lever
Forsaketh, and so it hath done ever."

The superlative *liefest* is found even in Shakespeare; as in "2 Henry VI. iii, ii:" "My liefest liege."

Rather is the comparative of *rath*, which we find in Milton's "Lycidas": "The rathe primrose" (the early primrose); and even in Tennyson, "In Memoriam": the men of rathe and riper years." He also uses it as an adverb in the "Idyls of the King": "Till rathe she rose." Robert of Gloucester speaks of the "rathe wyf" (that is, the former wife), of Edward the Martyr; and Spenser (Shep. Kal. Feb. 83), of "the rather lambes." The superlative *rathest* is found in Chaucer ("Complaint of Black Knight, 568"), and in later writers; as in Coryat's "Crudities": "they seldom cut the rathest [barley] before the beginning of August," etc.

Had rather, then, is simply *had sooner*, which is also used in the same idiomatic way.

R.

Geography.—A Mistake Corrected.

A geographical error became current in this country, some eighty years since, which persistently holds its place in respectable books of reference. President Dwight, in his "Travels" (Vol. I, p. 29), says: "West Rock, two miles and a half from the center of New Haven," is the "easternmost" hill of a group commencing "a range which has been named the Green Mountains."

Barber's "History of Antiquities of New Haven," (p. 23) calls West Rock the "southern extremity of the east ridge of the Green Mountains." The "Encyclopædia Americana," under "Green Mountains," says "West Rock, near New Haven, is the southern termination of the chain."

Dr. Dwight (in *op.*) says: "Two miles eastward from West Rock commences another range (Mt. Tom) in a mountain, called East Rock," which unites with "the range of the White Mountains." Again (p. 31) he says, "The northern termination of the two ranges (Green and White Mountains) which commence in New Haven, at the points of the East and West—two miles apart— is between two and three hundred distant."

In the annexed paragraphs Prof. Dana gives the correction, based on the geological character of the rocks and ranges, than which there can be no higher evidence:

[From the Am. Jour. of Science and Arts, Vol. X, Sept. No., 1875:]

This line of ridges from New Haven to Northampton was called the Mount Tom Range by President Timothy Dwight, in 1796 ("Travels," p. 5). Looking only at the general features of the country, he made this range a branch from the White Mountains; and the elevations of Western Connecticut, commencing at the West Rock trap range, near New Haven, he spoke of as a part of the Green Mountains. The error was not a bad one in 1796. But it has been reproduced since in geographies, encyclopedias, and gazetteers; and recently it has appeared in a school-book of Connecticut origin, and in a guide-book for the Connecticut Valley. It is alluded to here in order, if possible, to stop its further circulation. Over fifty years since, Professor Silliman corrected it, even in this journal, and yet it still survives.

[From the Amer. Jour. of Science and Arts, Vol. XI, Feb. 1876.]

Green Mountains.—On page 498 of the last volume of this journal (supplementary December number), a note is inserted correcting the blunders which have long circulated in geographies, gazetteers, encyclopedias, and New-England guide-books, as to the Green and White Mountains terminating in trap ridges—called West and East Rocks—in the vicinity of New Haven ; the fact being that East Rock is but a short appendage (half a mile long) to the system of trap dikes of the Connecticut valley, and West Rock, a southern portion of the same system. Prof. O. P. Hubbard has informed the writer that this extraordinary error in New-England geography has the following forms in "The Imperial Gazetteer," published by Blackie & Son at Glasgow, Edinburgh, and London, in 1855. Under *New Haven*, "Surrounded on three sides by spurs of the Green Mountains." Under *Green Mountains*, "A mountain range commencing near New Haven, Connecticut." Under *Connecticut*, "Some of its mountains, particularly the Green Mountain range," etc.
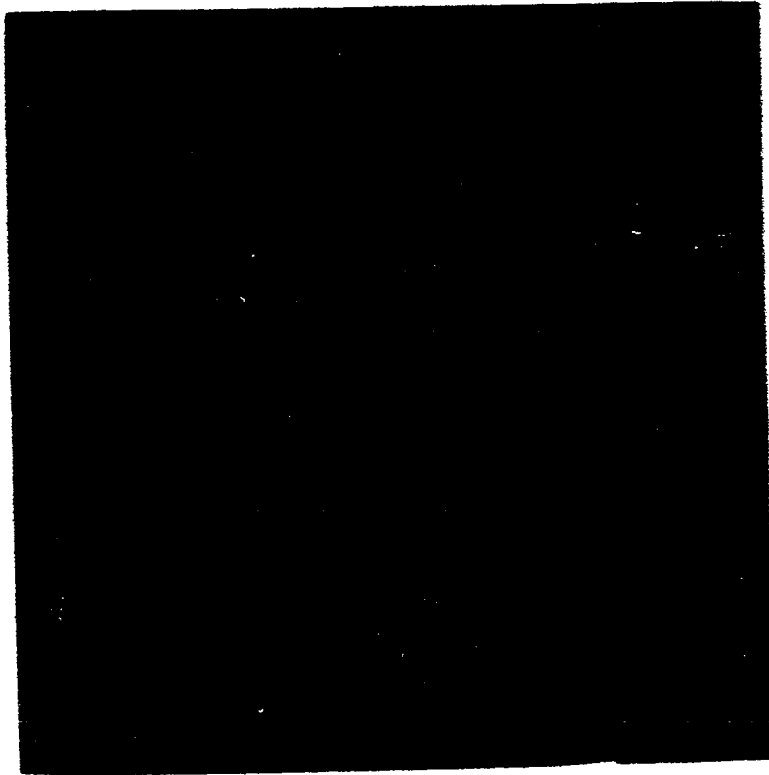
The Green Mountains consist of metamorphic rocks, and are not younger than Silurian. They have their greatest height in Vermont, and there received the name. The mountain system extends south through western Massachusetts and western Connecticut, and the whole is rightly called the Green Mountain chain. But the trap ridges of the Connecticut valley belong to the valley, and are of Jurassic origin.

It is to be hoped this will prevent the repetition of so serious a mistake in physical geography by respectable writers.

O. P. HUBBARD.

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The area of the quadrilateral *adbe* is measured by its base *ad*, multiplied by half the sum of its parallel sides *de* and *ab*, or $ad \times \dfrac{\overline{ab+de}}{2}$, which is $\dfrac{\overline{ac+ab}^2}{2}$

But the area of the quadrilateral *adbe* consists of half of the square of *bc* plus the two equal triangles *acb* and *dce*; or $\dfrac{\overline{cb}^2}{2} + ab \times ac$. $\therefore \dfrac{\overline{cb}^2}{2} + ab \times ac = \dfrac{\overline{ab+ac}^2}{2}$; or $\overline{cb}^2 + 2(ab \times ac) = \overline{ab}^2 + 2(ab+ac) + \overline{ac}^2$. $\therefore \overline{cb}^2 = \overline{ab}^2 + \overline{ac}^2$. Q. E. D. [J. A. G.