tington; 'Determination of All the Groups of Order p^m, p being any Prime, which Contains the Abelian Group of Order p^{m-1} and of Type (1, 1, 1, . . .),' by G. A. Miller; 'A Class of Simply Transitive Linear Groups,' by L. E. Dickson; 'Errors in Legendre's Tables of Linear Divisors,' by D. N. Lehmer; review of 'Recent Books on Mechanics,' by E. B. Wilson; review of Kiepert's 'Calculus,' by E. W. Davis; 'Correction'; 'Notes'; 'New Publications.'

DISCUSSION AND CORRESPONDENCE.

FORCE AND ENERGY.

To the Editor of Science: In my address, published in your number for July 4, I have used the word 'force' without saying as clearly as I should have done that it is used in the sense of energy, as that term is now applied in physics. It seemed to me that to a general audience force would be more significant. As Helmholz wrote of the Erhaltung der Kraft, perhaps an outsider may be pardoned for using 'force' with the above defined meaning.

Charles S. Minot.

Boston, July 5, 1902.

ETHER WAVES FROM EXPLOSIONS.

About a year ago the writer began a systematic attempt to examine into the effect of explosions upon the ether. A few prior experiments had yielded results explainable on the assumption that such action existed. The investigation was suggested by Young's observation upon a solar outburst as given in his work on the sun.* The Greenwich magnetic curves which Young gives for the dates August 3 and 5, 1872, are so persuasive in their character that an attempt was made to reproduce these results by a terrestrial explosion. It was also thought that the motion of rifle bullets might yield some recognizable result.

It seems probable that, in order to produce a magnetic disturbance, recognizable by a needle, the explosion should be as large and violent as possible. With the coherer as a receiver, it would seem that sharpness of the explosion and atomic periodicity might be more directly involved.

* 'The Sun,' 1881, pp. 156–159.

The work has been attended with great difficulty. The buildings and grounds of Washington University, where the work has been attempted, are in the heart of the city of St. Louis, and street cars are almost continually passing. Only between two and three o'clock in the morning was it found possible to obtain brief intervals fairly free from great disturbance. Even then the needle was continually in motion. The explosions at such an hour were necessarily limited in violence by the possibilities of damage to property, and have been doubtless an outrage upon people who wished to sleep.

So far the results have been inconclusive. Deflections have been obtained, but they have not been reducible to any system which could be rationally explained. It was apparent that the sound wave and the shock have been involved. This work will be carried on in the open country, where larger explosions can be made at a distance from the receiving apparatus. In the meantime it is most interesting to know that the volcanic explosion on the island of Martinique has apparently produced the results which we had been seeking.

Francis E. Nipher.

ECOLOGY.

To the Editor of Science: Doubtless your readers are heartily tired of the discussion upon the word ecology, and I shall not attempt to reply to Mr. Bather's letter in your issue of June 20, farther than to state that his explanation does not appear to me to improve his case materially beyond providing an ample cloud to cover a graceful retreat.

But aside from the main points at issue, I agree with Mr. Bather that the use of the word ecology in such an expression as 'the ecology of a glacial lake' is somewhat unfortunate. Every botanist interested in such studies knows that this phrase is simply a convenient abbreviaton for 'the ecological relations [or features, etc.] of the vegetation of a glacial lake,' and, when used in a botanical publication, it produces no misunderstanding. Nevertheless, as the present discussion has shown, it may mislead others, and therefore botanists could better use the word in such a way as to make

clear to all the real nature of the subject under consideration.

W. F. GANONG.

THE EUROPEAN POND-SNAIL.

TO THE EDITOR OF SCIENCE: It may prove of interest to some of your readers, interested in geographical distribution and its problems, to learn that there is a well established colony of the European pond-snail *Limnæa auricularia* Linnæus in Flatbush (Brooklyn). So far as I am informed this is the only occurrence in America of the well-known 'wide-mouthed mud shell' as it is called in England. The colony is well established, a number of individuals having been collected that were over an inch in length and correspondingly broad. They feed on pond-lily leaves, destroying the epidermis on the under side almost completely. They were no doubt introduced through accident on water plants, since the pond contains several well-known European hydrophytes. Inasmuch as the visits of water birds to this pond may lead to the young shells being carried away to stock other ponds, the occurrence of this species should be recorded.

B. ELLSWORTH CALL.

BROOKLYN, June 28, 1902.

TEXT-BOOKS.

THE evolution of educational methods in this country is interestingly set forth by President Harper in 'The Trend of University and College Education in the United States' (*North American Review*, April, 1902) and the university of the future is portrayed as centering about the library. Professor Harper names two centers for the university —the library and the laboratory; but for present purposes the laboratory may be regarded as the workshop in which are tested the 'receipts' of the text-books, so that the laboratory may in a broad sense be taken as an annex to the library.

In a university library to-day the books are so numerous as to require special training or assistance to find and use their information to best advantage. Books of course are written from many standpoints and for many purposes, from scholastic erudition to the mere passing of an idle hour, and wide is the range between the needs of the specialist and those of 'that delightfully vague person, the intelligent reader,' as Mr. Haddon puts it in his introduction to 'The Study of Man.'

As text-books have been the outgrowth of the needs of schools and colleges they reflect in extent and method the needs and limitations set by the requirements of each case. And since these requirements differed widely in different institutions, the number of text-books in each subject is large and their treatment varied.

The chief peculiarity of a text-book is brought about by the fact that it has been prepared for use, not in imparting knowledge, but in the training of the student mind. Its method of presentation is therefore frequently such as to require rather the maximum than the minimum of mental effort to master its contents.

The second limitation to an ordinary text-book, as felt by one who wants only to learn facts, is that set by the length of time given that study in some particular school or college or grade of schools. Hence the ground is covered sometimes quite incompletely, and quite often a limited view is presented in a way most valuable for use in mind-training, but with important topics omitted wholly rather than a less detailed but more complete outline of the subject.

A third limitation is set by the omission of much detailed 'elementary' information imperative to a full understanding of the subject, and assumed either as already known or that it will be (but too often is not) imparted by the intelligent teacher. This criticism of the teacher is fortunately becoming less pointed as the science of teaching is being learned and put into practice.

There exists however to-day a large class of would-be pupils who by force of circumstances must be self-instructed. They are mostly tied down by the necessity of earning a living for themselves and usually for others. Their minds may or may not be trained but they want to learn the known facts and their