hope there soon may be demand, the author might perhaps better satisfy a larger number of students by a thoroughly digested epitome of the present book, while the teacher should welcome another volume that would still further elaborate all but the anatomical part of the present book. For the teacher there might be added a consideration of the geographical distribution of frogs, with maps; a full discussion of the remarkable breeding and brooding habits of some exotic frogs; more ample reference to the field of regeneration in frogs; an account of the genesis of the egg and the sperm; and original illustrations. He would then have a fit complementary volume to Gaupp's 'Ecker.'   E. A. A.

Easy Mathematics, chiefly arithmetic; being a collection of hints to teachers, parents, self-taught students and adults, and containing most things in elementary mathematics useful to be known. By Sir Oliver Lodge, F.R.S. Macmillan and Co. 1905. Pp. xv + 436.

When a man like Sir Oliver Lodge writes on arithmetic we naturally expect an unusually high motive. In the present case this motive is set forth in such forceful terms as follow:

The mathematical ignorance of the average educated person has always been complete and shameless, and recently I have become so impressed with the unedifying character of much of the arithmetical teaching to which ordinary children are liable to be exposed that I have ceased to wonder at the widespread ignorance, and have felt impelled to try and take some steps towards supplying a remedy. The object in writing the book has been solely the earnest hope that the teaching of this subject may improve and may become lively and interesting. Dulness and bad teaching are synonymous terms. A few children are born mentally deficient, but a number are gradually made so by the efforts made to train their growing faculties.

To read an arithmetic written in a breezy style yet thoroughly sane from cover to cover is a surprisingly interesting experience for most people who try it. While those who are familiar with elementary mathematics may not learn any new facts by reading this book, yet there will probably be few who will not have a more cordial attitude towards the subject. It works a change of feeling and clearness of vision rather than a deeper insight into the more abstruse parts.

The charm of many illustrations lies in their extreme simplicity. For instance:

It is very often a mistake for teachers to suppose that some things are easy and other things are hard; it all depends on the way they are presented and on the stage at which they are introduced. To ascend to the first floor of a house is difficult if no staircase is provided, but with a proper staircase it only needs a little patience to ascend to the roof. The same sort of steps are met with all the way, only there are more of them. To people who live habitually on the third floor it is indeed sometimes easier to go on the roof than to descend into the basement. Educators should see that they do not forcibly drive children in shoals up an unfinished or ill-made stairway, which only the athletic ones can climb.[1]

The first part of the volume is partly historical. In some of this the imagination is explicitly allowed to wander beyond the established facts. In addition to most of the questions which are met in arithmetic and elementary algebra, there are chapters on *Easy Mode of Treating Problems that require a Little Thought, dealing with Very Large or Very Small Numbers; Pumps and Leaks, Differentiation, etc.* The work is divided into forty-seven brief chapters and throughout impresses one with the fact that the greatness of a man is perhaps most strikingly exhibited by his treatment of common subjects. The author with a narrow outlook would not make such a wise choice of subject matter and would not be apt to refresh the reader with such broad views as 'Real living arithmetic is the same in any country; and most important of all is that which must necessarily be the same on any planet,' and 'An equation is the most serious and important thing in mathematics.'

While the book naturally appeals most strongly to the teacher, yet it seems to be eminently suitable for those who desire to get a clear view of the subject matter which has been employed in their early training. The sub-title has a quaint eighteenth century flavor, but the book itself is thoroughly modern

[1] Page 13.

and may be regarded as one of the best expressions of the spirit of the recent reform movement in mathematical instruction.

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SOCIETIES AND ACADEMIES.

THE ST. LOUIS CHEMICAL SOCIETY.

AT the regular meeting of the society on Monday, June 11, Mr. W. R. Lamar presented a paper entitled 'Recent Investigations on the Constitution of Certain Alkaloids.' After a few preliminary remarks on the difficulties encountered in determining the molecular constitution of these substances and on the methods employed for the purpose, the paper was devoted to four substances: namely, conine, nicotine, atropine and cocaine. The society was treated to an exceedingly comprehensive and condensed account of the investigations into the constitution of each of these bodies, indicating the failures as well as the partial and complete successes. This was followed in the case of each substance by a similar account of the efforts at producing the same substances synthetically.

C. J. BORGMEYER,
Corresponding Secretary.

DISCUSSION AND CORRESPONDENCE.

THE HAILSTORM OF JUNE 23.

To THE EDITOR OF SCIENCE: During the storm which swept the Atlantic coast on Saturday, June 23, the hailstones which fell at Perth Amboy, N. J., and vicinity were of such large size that the following observations from a house on the shore of Raritan Bay may be worth recording. The hailstorm was preceded by the piling up of great masses of cumulus clouds, while out in the Lower Bay a tornado caused a waterspout; there was also considerable lightning and a brief heavy shower of rain, so that the usual conditions for a severe hailstorm were satisfied. About four o'clock big hailstones began to bombard the house, at first few in number and in a very slanting direction, then in a roaring downpour that made the bay spout up into thousands of white geysers. This lasted, perhaps, five minutes.

We immediately gathered some of the hailstones which thickly dotted the lawn. They ranged from the size of a cherry to that of a duck's egg, the larger ones being very abundant. The smaller ones were more or less spherical, consisting internally of broad concentric zones of softer, more snow-like, and of harder, darker ice, the broken surfaces reminding one of polished sections of concretionary nodules of agate. The larger ones were oblate spheroids, oval in contour, with crater-like depressions in the center of each flattened side. The largest ones filled the palm of the hand, and upon being measured with great care proved to be not less than three and one eighth inches along the long diameter and eight inches in circumference. The surface was irregularly tuberculated, and the center, core or axis of the spheroid was always distinct, appearing in broken hailstones as a small white spot. None were observed in which the nuclei were formed of small pebbles. The hailstones seemed harder to crack in the teeth than ordinary ice.

The impact of their fall caused circular depressions in the hard-packed tennis court, and later on the soft sand of the beach the still unmelted kernel of each hailstone was found in a depression containing a close coil or many concentric circles of sand.

Mr. George H. Pepper, of the American Museum of Natural History, who also observed the same storm in Tottenville, at the southern end of Staten Island, appends the following notes:

The first evidence of the storm in Tottenville was a heavy rain accompanied by a shower of small hailstones about the size of a pea; these stones were similar to snow ice. The rain continued and after an interval of perhaps five minutes a second shower of hailstones was noticed; these ranged from the size of hickory nuts to walnuts. The fall of these stones was followed by the larger ones, the intervals being, perhaps, two or three minutes. The shower carrying the large hailstones lasted not more than three minutes, but during that time twenty-five glasses were broken in the house in which I happened to be. Over fifty glasses in memorial windows