as the pointer moves from bottom to top. The columns can be made as long as the board will allow.

When the above is thoroughly mastered, and added with great rapidity, ask for the combinations whose sum is 12. Deal with these as outlined above. Then follow in a similar manner with combinations of two numbers whose sum is 13, 14, 15, 16, 17 and 18, always keeping in mind the necessity of advancing very slowly, and only when each step is thoroughly mastered, and the columns added with great rapidity.

The following represent a mixture of some of the combinations which will be used:

7	3	7	8	7	7	9	6
5	9	6	6	8	6	8	7
8	8	7	6	5	8	5	2
8	5	5	5	9	8	8	9
4	7	8	9	6	4	7	9
8	8	7	6	5	9	6	4
9	6	9	7	7	8	8	8
3	6	4	7	8	3	6	8
6	5	7	8	9	4	3	2
4	5	3	2	1	6	7	8
—	—	—	—	—	—	—	—

It may require months for a majority of the class to master these combinations, so that they can add with "lightning speed." But speed is sure to come. Progress will, of course, depend upon the size of the class, and the time at the teacher's disposal. Working with my class since September, using from five to ten minutes a day, just previous to other mental arithmetic, the results are most satisfactory. Not only have we secured rapidity and accuracy in addition, but in all the other forms of mathematical work as well.

An occasional "time" contest among those members of the class most proficient in the addition exercises adds much to the interest and enthusiasm. Any teacher can arrange such a contest in accordance with the particular circumstances of the school.

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The interesting account in this number of the life and stories of Hans Christian Andersen will lead children to wish to know more of that famous author who wrote for children. A few stories, including "The Ugly Duckling," which he said was like the story of his own life, will be found in the "Classics for Canadian Children" series, two little volumes of which are published by Messrs. A. & W. Mackinlay of Halifax. Number 1 is devoted to fairy tales and fables; number 2 to stories from English history. Price 10 cents each.

Mineralogy.—No. V.

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As announced last month, the present article will deal with limestone and gypsum. Although the general term *limestone* is usually applied to a rock of more or less impurity, while the purer mineral form is denoted by *calcite,* it will be convenient here to denote all varieties by the general term. It is important to note, however, that only the mineral calcite has the chemical formula $CaCO_3$; while ordinary limestone is a very impure calcium carbonate. I might add, in passing, that another mineral, *aragonite,* has the same composition as calcite, but belongs to a different system of crystallization. The pearly inside coating of a sea-shell is aragonite.

Limestone, like quartz, consists of several varieties, according to purity, structure and crystallization. All, however, are moderately soft, being easily scratched with glass; all have a white streak; and all bubble if a drop of dilute hydrochloric acid be placed upon them. The bubbling, or effervescence, which is the standard test for limestone, is caused by the escaping carbonic acid gas (CO_2) which the acid liberates from the mineral. Other carbonates will effervesce with hot acid—often only after they are powdered, but no other common one will do so with cold dilute acid.

Some of the more common varieties of limestone are Iceland spar and dog-tooth spar,—both of which are crystallized calcite,— marble, compact limestone, chalk, hydraulic limestone, oölite, coral, shell-limestone, travertine, stalactite and stalagmite.

Pure Iceland spar is colorless and transparent. It has excellent cleavage in three directions, always breaking in rhombohedrons. This property itself is a very good distinguishing feature. Make a dot on paper with your pencil, and look at it through a crystal of Iceland spar. You will probably see two dots. Turn the crystal round, keeping the same face on the paper. How do the two dots behave relative to each other? This property of "double refraction" is very marked in calcite.

Dog-tooth spar, the name of which is significant, occurs in sharp six-sided pyramids. One often finds it in geodes, or lining the sides of rock-fissures.

Marble, a metamorphic limestone, is too well known to need description. Notice its granular structure. Its variation in color has much to do with its commercial value. *Compact limestone* includes all varieties of dense fine-grained calcare-