Trailing Arbutus.

[The following tribute to the Mayflower was written by the late R. C. Hubly, a member of the first contingent of volunteers who went from Canada to South Africa in 1899. Mr. Hubly was at that time a teacher at Hampton, N. B., and nobly responded to the call of duty. Exposure on the South African veldt brought on a disease to which he succumbed some months after his return from the seat of war The lines, written several years ago, were given to the REVIEW for publication, but as the season was inappropriate, they have lain neglected, but not forgotten, until now.—EDITOR.]

Dear little, modest flower! promise of summer!
Daughter of spring cradled in ice and snow!

The mayflower coming, as it does, when the last cold gasps of dying winter mingle with the warmer, fragrant breath of spring, is, perhaps, the most welcome of all flowers. How eagerly, for days before it appears, we search the copse, in the hope that some bud, more forward than its mates, may have burst into bloom! How when found we pounce upon it, as if it were a long lost gem! How we bear it home to preserve it long after perfume and beauty are fled!

The mayflower teaches many lessons to the pupil of Nature. First, perseverance. He who would find the flower may not glance carelessly over the field, but must stir the leaves ere he will see its sweet, modest, blushing face, for even in its boldest moments it will only peep from beneath its leaves; here we have a lesson in modesty. True worth shall be brought to the front, and nobility never seeks to push itself forward, but waits to be discovered.

Then, the humility of the flower! Entitled by its beauty to hold its head as high as does the rose, qualified by its perfume to rank with the lily; as deserving of recognition as any, it prefers to occupy a lowly position, as though to teach you and me that lowliness cannot debase; that where goodness is there is elevation.

The lover of the mayflower knows that among the half-withered and smaller leaves the blossom is to be found, while the larger thrifty plant presents often no flower as if the leaves sacrificed their very life in the birth of the blossom. On the other hand, those large, showy leaves come short of the honor due to their withered neighbors; they in their selfishness give no blossom to the world; do less towards making it more beautiful. So those who are most forward in this world generally disappoint us, and leave behind no monument of worth.

I have been teaching for fifteen years, and have always taken the REVIEW. Have found it a great help, and no teacher should be without it.—C. H. G.

The Formula of Water.

BY JOHN WADDELL, PH.D., School of Mining, Kingston, Ont.

A friend of mine was asked by a young man if he would tutor him in chemistry in preparation for an examination. "How much do you know about chemistry already?" said my friend. "Absolutely nothing," was the reply, "except that HO_2 is water." I will venture to say that nine out of ten (perhaps even ninety-nine out of a hundred) of the pupils studying chemistry in our high schools, and I might include the junior classes in our colleges, though they would laugh at the mistake of saying HO_2 instead of H_2O, could give no satisfactory reason for preferring the latter formula to the former.

The majority of pupils on being asked could suggest no reason at all. They have been taught it so, and if they have thought of the matter at all, which is unlikely, they may have some kind of hazy idea that a great chemist by a brilliant intuition hit upon the formula and that it is therefore right, of course. They do not know that even as late as twenty years ago some great chemists, such as Bunsen, wrote HO as the formula, and are not troubled by a conflict of authority.

Other pupils will attempt to give reasons for the formula they employ. Among the most sensible of the reasons will probably be that the molecule of water consists of two atoms of hydrogen and one atom of oxygen, or that the electrolysis of water gives two volumes of hydrogen for one of oxygen. But in the first reason the fact is overlooked that not only have we never seen atoms or molecules, but we can never hope to see them. Our ideas of atoms and molecules are deductions from observation and experiment, and instead of the argument proceeding from the premises of atoms and molecules to the formula, the argument should go from experiment to the formula, and the accompanying deduction that the molecule of water contains two atoms of hydrogen and one atom of oxygen.

The argument from the electrolysis of water is based on experiment, and is to a certain extent good, but it is not conclusive because it is possible that the quantity of hydrogen represented by H would occupy twice the volume of the quantity of oxygen represented by O. Carried out consistently, the argument would lead into error in some cases. Ammonia, to which the formula NH_3 is given, decomposes into three volumes of hydrogen to one of nitrogen, but, on the other hand, phosphine, to which the formula PH_3 is given, decomposes into six volumes of hydrogen to one of phosphorus.

There are two arguments in favor of the formula H_2O that can be easily followed by the junior student; one is entirely experimental, the other involves a short train of reasoning.

The first argument is based on the decomposition of water. When water is decomposed by the electric current, all of the hydrogen separates at one pole and all of the oxygen at the other. Also when