with this lesson. It will be exceedingly interesting and profitable, if teachers are well informed, and pupils eager to learn new things.

Some may think it a waste of time to spend much of it in this way, and may consider it better to devote it to actual reading. But will not scholars feel more interest in what they understand, and will they not give it more expression? Seeing that so much may be made of a reading exercise, will it not gain importance in their estimation, and will they not be likely to try to do their part well?

Shakespeare's Dogberry says that "To read comes by nature"; and as far as the articulate expression is concerned, he is not far wrong. Still, culture makes great compensations for natural deficiencies in this direction as in all.

Since Demosthenes overcame so many and so formidable impediments of speech and voice, and became the greatest orator of his nation, no one need despair.

Of course there is much unfruitful soil where nothing will grow, let the seed be perfect and the care most attentive. We cannot expect to make excellent readers of all our pupils; but let us use all the means possible to do so, trusting that good results will sooner or later follow.

M. K.

ON MODERN CHEMICAL NOTATION.

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THE recent changes of chemical notation and nomenclature which are now adopted in the best English text-books, are somewhat puzzling to teachers trained under the old system—and although careful readers of current chemical literature have seen the impending change approaching for the last fifteen years, there is a feeling of surprise as well as relief even in their minds, at its complete adoption, both in the old and in the new world.

The change is as complete as, and in many points analogous to, that which overtook the Science of Botany in its transition from the Linnean to the Natural system, and the change moreover presents some of the same balances of advantage and disadvantage in relation to the teaching of the science to the young.

The Linnean system was both simple and perspicuous—its lines were sharp and well defined, and its classification was perfect. It was however too mechanical for the expression of natural law—and to some extent outraged nature.—A more philosophical view of vegetable structure as a whole, resulted in the dismissal of an arbitrary standard of classification and ventured upon a more general and more truthful association of facts. So in the great system of Berzelius and Dalton—the constant reference to the elements Hydrogen and Oxygen whilst it assisted in the formation of tables of elements, both upon the Oxygen standard of 100—and upon the Hydrogen standard of unity—respectively failed to accomplish that simplicity of expression and that perfection in atomic proportion which were involved in the law of Prout, and which should have been the legitimate consequence of the Daltonian system, had either oxygen, or hydrogen, really been typical representatives of the remaining elements and been always associated with them in multiple proportion by weight.

It is due to the great Berzelius (than whom a greater Chemist never lived) to state that modern science has in the case of Water, simply returned to his original equivalents of (H_2O), and that the comparatively recent researches of M. Dumas pursued with all the rigor of debate and assisted by all the facilities of modern appliance, failed to detect any important error in his famous table of the combining proportion of the elementary substances known to the chemists of his time.—It is to this research of M. Dumas that we may trace the rapid change of opinion amongst the old school chemists of Britain. The glamour of the Daltonian atom and of the Prout fantasy fell before the Ithuriel spear of Dumas, who proved that the composition of Chloride of Silver could not be expressed in whole multiples of hydrogen.

But the position of British Chemists could not be taken by a "coup de main," nor by a German "legion"—it was slowly abandoned by inches—and the labours of a Williamson, a Hofmann, a Watt, a Odling, a Frankland, a Brodie and a Roscoe, severally and combined have contributed researches and arguments which eventually undermined the citadel and mastered the situation.

Now let us take up a modern text book of Chemistry and we find a natural order of types—resembling the system of Zoology and Botany—we no longer have to regard a compound simply in its relation to hydrogen on the one hand or to oxygen on the other; we have to trace it up to a type towards which it has a natural place or order—and into which it is fitted not by the arbitrary standard of weight alone, but also by the addition of a volumetric equivalent. Simple and beautiful therefore as was the purely gravimetric method of Berzelius, still more beautiful is the natural system of Laurent, Gerhardt and Williamson—in which weight form and volume together, constitute the typical series.

Under this arrangement, water no longer occupies the chief post of Janitor or keyman to all other chemical combinations—the "pons asinorum" is no longer H O but H Cl.

The arrangement of elements is no longer metallic and non metallic.

It is univalent, bivalent, trivalent, quadrivalent, quintivalent, hexivalent. &c., &c.

Now, as we have divided our thoughts on Botany in reference to seeds as (Monocotyledonous and Dicotyledonous)—in reference to leaves as (parallel and reticular) in reference to stems as (endogenous and exogenous) so we may extend the classification of elements—to one volumed, two volumed, three, six, and poly volumed natural associations. The table of elements no longer presents two long columns of opposed atoms with a large rear rank of indifferent bodies, but becomes classified into Orders, Genera and Species—after the manner of scientific association.

At present by way of illustration the four leading groups may be cited.

H O N C

In these four elements we have the representations of the whole organic kingdom. Animal and vegetable. Organic matter usually contains these very elements,—as principal elements. They form four principal types of the Inorganic kingdom and illustrate the mode of classification under consideration, pro. ex:

1. H+Cl—Equivalent by vol. and weight.
   H1 Cl 35.5. Vols equal.
2. O+H_2—Equivalent by multiples of vol. and weight.
   H_2 O 16. Vols. 2 to 1—
3. N+H_3—Equivalent by multiples of vol. and weight.
   H3 O 14. Vols. 3 to 1
4. C+H_4—Equivalent by multiples of vol. and weight.
   H4 C vols. 4 to 1.

Of these examples the first is called univalent—combining with equal volume or molecule—
The second bivalent.
The third trivalent.
The fourth quadrivalent.
To borrow an illustration:
Hydrogen is a "one horse coach."
Oxygen is a "chaise and pair."
Nitrogen is an "Unicorn" (or a "3 horse bus.")
Carbon is a "coach and four," and of course this series might be extended to all the wonders of the Hippodrome.

The centre of the idea lies in the separation of the mechanical atom of Dalton from the mechanical molecule of Laurent.

The latter, altho' equally "indivisible," "indestructible" and "incompressible" may prove upon due examination to be a *four*, *six*, or *sixteen* horsed coach as the case may be.

(To be continued.)

ASPIRATIONS OF YOUTH.

Higher, higher will we climb,
Up the mount of glory,
That our names may live thro' time
In our country's story;
Happy when her welfare calls,
He who conquers, he who falls.

Deeper, deeper let us toil
In the mines of knowledge,
Nature's wealth and learning's spoil,
Won from school and college;
Delve we there for richer gems
Than the stars of diadems.

Onward, onward may we press
In the path of duty;
Virtue is true happiness,
Excellence true beauty;
Minds are of celestial birth,
Make we then a heaven of earth.

Closer, closer let us knit
Hearts and hands together,
Where our fireside comfort sit
In the wildest weather;
Oh, they wander wide who roam
For the joys of life from home.

Nearer, dearer bands of love,
Draw our souls in union,
To our Father's house above,
To the Saints' Communion,
Thither ev'ry hope ascend,
There may all our labours end