be obtained by making a board to fit under the lower sash, when it is raised. This causes the air to come in between the upper and lower sashes, and gives it the desired upward tendency. Drafts must be avoided, and if there is no other way of securing pure air but by opening the windows, the pupils should march or exercise freely while the windows are opened far a few minutes.

3. *Seating.*—The bodies of children are often distorted through their being compelled to sit at desks which are too high or too low. A grievous error is sometimes committed by fixing the seats too far away from the desks in front of them. This compels the child to lean forward, and prevents resting the back. Little ones are sometimes injured in the thighs and spinal columns by being placed on seats which are so high as to prevent their feet from resting on the floor.

4. *Positions of Pupils.*—Incessant watchfulness is necessary to prevent the taking of improper positions by the pupils. The following hints will aid in correcting many errors:

(a) Position while Reading.—(1) While sitting: heads erect, shoulders back, backs resting against the backs of the seats, both feet resting on the floor, books resting on the desks at a convenient distance from the pupils, and supported by both hands so that the page would form a right angle with a line drawn from the eye. This position secures the comfort of the body, and keeps the book at a proper distance from the eye. (2) While standing to read: head and shoulders as before, body resting on both feet, book in *left hand only.* No position could at the same time do more to curve the spine, contract the chest, and injure the eyes, than that too often taken in school by holding the book in both hands and bending the head and shoulders forward.

(b) Position while Writing, Drawing, or using Slates.—Different opinions are held as to the pupil's position in relation to the desk while writing. Some teachers prefer the side, some the front, and some the diagonal position. All agree, however, that the feet should be firmly planted on the floor *in front* of the body, not doubled under it as is frequently the case, and that the head should be erect, the chest forward, and the upper part of the body steadied by placing the left hand on the desk. Every pupil needs to be constantly watched in order to prevent stooping over the desk.

(c) Position while Standing in Class.—Pupils are frequently allowed to lean in ungraceful postures against the wall or the desks, when called out in a class. Such pupils acquire careless habits, and lose to a greater or less degree the erectness and compactness of form which are so essential to health and gracefulness. Whenever a pupil stands he should stand on both feet. The habit of standing on one foot frequently leads to curvature of the spine. It is not well for pupils to stand too long at a time. Indeed no exercise or study should be continued long without a change.

(d) Position while Listening.—While pupils are listening to explanations by the teacher, or while following the teacher on a map or black board, they should sit with backs against seats, feet on the floor, and arms at the sides, with hands resting on the laps in an easy and graceful position. Folding the arms on the breast is objectionable, as it tends to round the shoulders, and would be a most improper position for either ladies or gentlemen to assume in society. Folding the arms behind is less objectionable.

(e) Position while Marching.—Never let the pupils walk on their toes, and never allow them to march with their hands folded behind.

LESSONS ON CHEMISTRY.

I.

1. All things visible are composed of **Matter**, which is capable of assuming three different states or conditions, namely—the solid, the liquid, and the gaseous form. It possesses different properties, as color, hardness, taste, divisibility, etc. Let us notice especially that it fills space and has weight. We measure the quantity of matter, that is its *mass*, by its weight which is invariable for the same quantity of matter, while the space it occupies, that is its *volume*, may vary very considerably. Most other properties admit of some sort of change or variation, but the science of chemistry rests on the foundation fact that matter is indestructible by any means known to us, and that its weight is unalterably the same and serves to measure the amount of matter present.

2. Matter is not continuous throughout the substance of any bodies known to us. Most bodies are plainly full of pores, and every substance may be forced into less space by cold or pressure, or expanded into a greater volume by the application of heat. We are unable to explain these facts except on the supposition that bodies are built up of a vast number of minute parts, capable of moving nearer to each other under the influence of cold or pressure, and thus causing the whole body to contract in size, like a regiment closing up its ranks; also capable of receding from each other when heat is applied, and thus causing the body to occupy more space, like a regiment with its soldiers spread out in open order. These minute particles of any substance are called **Molecules**, which may be defined as the smallest particles of a body that are capable of separate, independent existence, but incapable of further subdivision without a change of properties.

3. Matter may be subjected to two different kinds of change or variation, namely—chemical and physical. A physical change affects matter in the mass; a chemical change alters the molecule. Though it is sometimes difficult to distinguish these changes rigidly, yet it is not difficult to convey a clear, general idea of the kind of observations with which the chemist has to deal. Molecules are conceived by the chemist to be collections of still more minute portions of matter called **Atoms**. Whether each atom is in itself an aggregate of smaller particles, or whether it is in its very nature indivisible, are questions upon which the chemical theory has no hold. The chemist cannot break up an atom of carbon or of oxygen any more than the astronomer can break up the planet Mars or Jupiter. The absolute weights of atoms have not yet been ascertained. But chemists have discovered how many times heavier each elementary atom is than an atom of hydrogen. Thus we know how many times heavier an atom of carbon is than an atom of hydrogen, namely, about twelve times. We can prove that an atom of sulphur is about thirty-two times as heavy as an atom of hydrogen. The ratio of the weight of its atom to that of hydrogen is called the **Atomic Weight** of a substance. The ratio of the weight of its molecule to that of the hydrogen atom is called its **Molecular Weight.** These atomic and molecular weights have been determined by multitudes of careful experiments, involving great labor and a skilful comparison of results. The evidence can only be understood by an accurate acquaintance with the details of the very numerous chemical processes from the consideration of which they are derived.

4. Chemistry deals with the changes produced among the atoms composing the molecules of bodies, which changes result from a peculiar, and very powerful influence called the *Chemical Force, Chemical Affinity,* or *Chemical Attraction.* The similar particles of a mass of matter are held together by the force of cohesion; the atoms of a molecule, and the single molecules of a compound molecule, are bound together by chemical force. The study of this chemical force, its effects, and the laws that govern its action, constitute the special province of chemistry. It is *the aim of the chemist* to examine the properties of all the different substances that occur in nature so far as they act on one another, or can be made to act on one another, so as to produce something totally different from the substances