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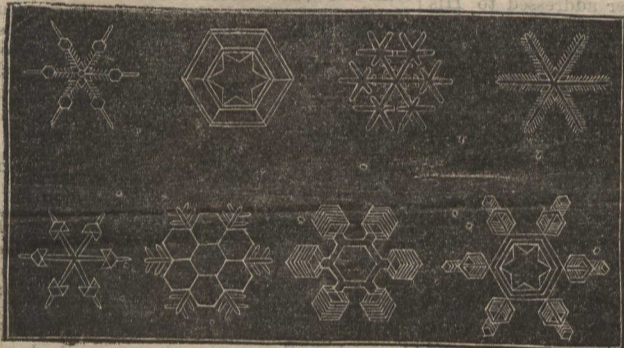
A DROP OF WATER.

Although a drop of water may be a common thing it is possessed of some very uncommon and wonderful properties, a few of which we would like to tell you about. Now in the first place, what is water? About a century ago the general belief was that water was one

oxygen of the latter and the compound thus formed is common water. But although two quarts of hydrogen combine with one of oxygen, don't think that they form three quarts of water, for if it were so we should either be drowned or steamed to death the first time we lighted the gas. When the two gases unite they undergo condensation so that they occupy much less space than formerly. Eighteen hundred quarts of the mixed gases form about one quart of liquid water. The force thus mildly exerted in making the original gases combine and condense to a single gallon of water is great enough to lift a weight of more than forty million of pounds to the height of one foot. Only think of it. These tremendous forces are operating around

us so quietly that we scarcely notice them.

Snow, which is water in a frozen state, forms itself into some of the most beautiful shapes, several of which can be seen by our illustration. Every one knows of the strength of the drops of water which form the stream and which we take advantage of to grind our corn; with what



MAGNIFIED SNOW-FLAKES.

of the four elements. But it is now known that water is a compound of oxygen with hydrogen in the proportion of one equivalent of hydrogen to two of water. To illustrate the above belief let us try a little experiment and see if we cannot find out something.

Take an ordinary gas-burner with a stream of gas issuing from it; now light the gas, and hold close over the flame, just for an instant, a cold piece of procelain—say a teacup, or saucer; on being removed the surface will be found covered with moisture; minute drops of water, obtained from fire. Of course this water must have come from the gas, or air, or from both. The gas from the burner consists of a mixture of different gases, one of them being called hydrogen. The air on the other hand is composed of two other gases, namely, oxygen and nitrogen; when hydrogen is burned in the air it unites chemically with the

terrible blows the ocean's waves batter the cliffs along the shore, but little drops of water do much more work in another, and a vastly more powerful way.

Almost every substance when heated expands, and when it is cool contracts, but there are exceptions. Just fill a bottle with water, cork it tightly and leave it out doors on a cold winter's night. In the morning we will find that the water has expanded in cooling to such an extent that it has burst the bottle. An iron bomb-shell filled with water, tightly plugged and exposed to a sufficient degree of cold will throw out the plug with great force or the shell itself will burst. In winter time little drops of water make their way into the cracks and crevices of the rock and there freezing and splitting the solid ledges open. Thus huge mountains are slowly ground to powder by the action of drops of water, and rocky and barren places are gradually made fertile. It is indeed fortunate for us that water in freezing is, under certain circumstances, an exception to the rule of expansion and contraction. It follows the rule, however, the exception being only when it is at or near the freezing point. Ice will contract upon cooling, so will water; it is only when the water is forming into ice that it expands so wonderfully. A providential result of that expansion is that ice is lighter than water and thus can float upon it. If the ice were heavier than water it would as a necessity sink to the bottom, leaving room for new ice to form, and thus before the winter's close the ponds and rivers would be a solid block of ice, which of course would cause the death of all the fish.

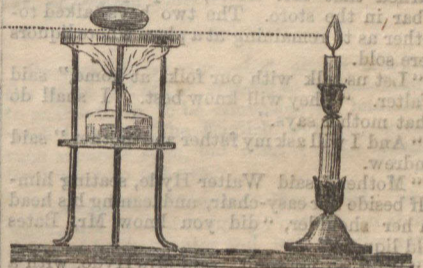
But suppose we leave frozen water, and take a look at steam. Whenever any liquid is changed into vapor, a great deal of heat disappears, is seemingly used up, being really converted into motion, and of course the more rapidly the vapor is formed the more rapidly heat vanishes. When the vapor is again condensed to liquid, the heat which has disappeared is again set free and rendered manifest to us.

Suppose you drop a little water on the cover of a red-hot-stove—it quickly forms itself into a little ball which hops around without actually boiling. Now when water is in that state it is said to be in the "spheroidal state." When the water falls on the hotstove a little of it is immediately changed into vapor which forms a sort of cushion for the drop to roll around on; if you break the drop and disturb the cushion the whole evaporates almost simultaneously, and if you place your eyes on a level with the drop you will be able to look between it and the hot metal, and see that they do not really touch.

A most interesting substantiation of this fact can be seen at any glass factory; a man after wetting his arm thoroughly in a tub of water will plunge it in a vessel filled with the molten glass and draw it out without injury; his wet arm coming in contact with the red-hot-liquid will form a vapor which completely protects him from injury. The glass must be at the proper degree of heat or the vapor will not form quickly enough and loss of limb will be the result. Would some of our readers on their visit to a glass factory try this experiment and inform us of the result!

EARLY RISING.

There is another class of superstitions borne down to us from the crabbed times of our Puritan ancestry which I fancy we shall also somewhat shamefacedly own. They were the daily maxims which formed a part of the teaching in every genuine New England home, and their permanence, as a part of our mental constitution, is an encouraging circumstance to educators who sometimes are inclined to think that even line upon line and precept upon precept fail to make their impression upon the wayward mind of youth. To remove this fear, we stand as living monuments, boldly avowing, first, that we find it constantly difficult to convince ourselves, though our reason tells us that we are absurd,—that it is not a moral duty to rise before, or at least, with the sun. Day by day, as we descend to our eight o'clock or nine o'clock breakfast, we are conscious of a certain sense of moral torpidity which we know to be unreasonable. It is in the effort to shake off this sense which is only the remnant of an old superstition that we write. The general axioms on the subject of early rising, which helped to make the New England Primer and the Farmer's Almanac a never-failing source of supposed improvement, and which were afterward re-enuciated by Franklin, do not apply to the present day nor to city life. What is



FLAME SEEN BETWEEN THE HOT SURFACE AND THE GLOBULE.

gained even for useful work by rising at six, and being obliged to take a nap in the middle of the day? Why not do up all our sleeping at once, and have a clear sweep for work? If, again, one could carefully rake up and cover the embers of his fire at nine, p.m., and sleep the sleep of the righteous till six, he might possibly rise at six or even five, though why, even in that case, any sane person should insist on doing two hours' work before eating, and call such action virtue, I could never understand. Circumstances alter rules as well as cases, which is what we of Puritan stock find it hard to understand. I myself know two young women of New England birth and training who, though they go into much evening society, and are frequently awake at midnight or after, each week during the New York winter, yet persist in being punctual every morning at the half-past-seven breakfast of the family. True, they take long naps in the afternoon; true, they break down every year by March; yet they gallantly return to the assault every autumn, and would feel ashamed and guilty if they did otherwise. So strong is the force of superstition!

In the future more perfect days, it will be considered a sin to awake any one from sleep except in cases of life and death, and our grandchildren may perhaps be free from the inherited weakness of believing, because the flowers and the chickens and the birds wake when the sun does, that therefore a human being should do so. By what logic do we select the one action of waking as suitable for our imitation?—*Anna C. Brackett, in Harpers' Magazine.*

—We never see the song, "Oh, to be nothing," without thinking that another headed, "Oh, to be something," would be equally in place. How very many professing Christians are truly nothings! They do nothing for Jesus—nothing for sinners who are constantly about them. Will not some gifted one write a song on the theme, "Oh, to be something," and teach those who are already nothings to sing it?—*Kentucky Presbyterian.*



SPHEROIDAL STATE OF WATER.



EXPERIMENT WITH BOMB-SHELLS.