

naked eye, the water flies off from the surface and fills the air with vapor from which it is again precipitated upon a cold surface in the form of visible moisture.

This property of evaporation is common to all liquids and to some solids, but differing greatly in degree. If you place upon your hand some ether or alcohol, it will soon evaporate and leave the hand dry. Water evaporates much more slowly. Solid ice will evaporate slowly and waste away in dry air. The same is true of snow and solid camphor. Take a piece of camphor and put it in a drawer, and in a few months it will be all gone.

What are some of the benefits arising from evaporation? It is by the process of evaporation from the surface of the ocean and from the land that the air is loaded with vapors, which in due time descend in the form of rain. Were it not for this property of evaporation, the earth would in a short time be a sterile waste through excessive dryness. Vegetation would soon wither and die by the complete drainage of the country of its waters.

Evaporation is one of the great processes for purifying the air and waters. Let us see. Evaporation takes place abundantly from the surface of the ocean, but it leaves behind all the impurities of the ocean, and all of its various salts, and when the air is saturated with moisture it is blown upon the land in the form of rain. So also evaporation takes place from the soil when the moisture has served its purpose in the growth of vegetation and passes into the air to descend again as rain.

Evaporation takes place more rapidly when the air is dry. Housekeepers say that water evaporates more rapidly from boiling water just before rain. If so, the air must be dry, and the atmosphere becomes more rapidly saturated with moisture and consequently soon descends in the form of rain. When the pressure of the atmosphere is removed, evaporation takes place more rapidly. Ether will boil violently at common temperature when the atmosphere is removed by an air-pump. Advantage is taken of this fact in evaporating molasses for the manufacture of sugar. The syrup is put into a huge copper globe from which the air is partially pumped out. The liquid will begin to boil at about one hundred and forty degrees, instead of two hundred and twelve, the boiling point of water, which induces rapid evaporation without the risk of burning. Cider and milk and vegetable extracts may be condensed in the same way.

One great advantage of evaporation arises from its rapid reduction of temperature. If you put a little ether on the back of your hand and swing it through the air, it will be painfully cold from the rapid abstraction of the heat during evaporation. When carried on under favorable circumstances, water may be readily frozen. Hence in a clear night water will freeze more rapidly than during one that is cloudy. Clothes hung out to dry in a cold wind will freeze before anything else. Damp clothes will rapidly reduce the temperature, and endanger the health.

Sometimes it is necessary to boil substances at a higher pressure than usual. This is done by boiling under atmospheric pressure. Bones can be dissolved in this way. In this way the heat can be raised to more than four hundred degrees.

Rapid evaporation may be promoted by blowing over the surface. We recently saw a process for drying wool in large quantities simply by warming it by means of steam pipes, and then blowing through it by machinery large quantities of cold air.

There is one curious phenomenon connected with evaporation. If you throw water on to a hot stove it will not evaporate, but dance about over the stove in globules. These globules are surrounded by an atmosphere of vapor which keeps them cool and prevents them from evaporating; but if you let the stove cool they will evaporate with great rapidity. By means of this fact a very curious experiment can be performed. By taking a little platinum crucible and heating it to a white heat and dropping into it liquid sulphurous acid, water may be frozen to a solid mass in the vessel and thrown out upon the floor. This depends upon the rapid evaporation of the acid. It is on this principle that a person by wetting his hands may dip them into melted lead without injury. We have seen a workman wet his finger and dip it into a stream of melted iron as it flowed from a furnace, but woe to the unlucky wight who should attempt the experiment without first wetting his finger. Extent of surface promotes evaporation. This is manifest when we harrow a piece of land on a dry day in spring. It will dry much more rapidly as every farmer knows.

No. 3.—Amber.

This curious substance is familiar to most persons in the shape of beads, buttons, and mouth-pieces for meerschaums. It is found in nodules in the lower part of what geologists call the Tertiary formation. It is frequently found between the bark and the wood of fossil trees, which shows that it was a resinous matter as formed in those trees which exude that class of substances.

That amber was once a soft substance is evident from the fact that insects, leaves, and other portions of vegetables are frequently found in them, perfectly preserved in all their parts, just the same as if an insect became fastened and imbedded in a soft gum on a tree which afterwards hardened to a solid. Naturalists have detected and described more than eight hundred different species of insects thus entombed in the amber. Though found in the most northern regions, they appear to have been tropical insects, showing that the climate was warmer during the period of their existence than now, while not a single species is known to exist at the present time.

The most important locality, perhaps, of amber, is along the shores of the Baltic sea. It is frequently worked out of the clay along the banks of small streams, or on the shores of the sea, and is gathered by the fisherman, who sell it to the merchants to be transported over the world. It also abounds in Sicily, Poland, Saxony and Siberia. It has also been found at Gay Head, Massachusetts, and in Greenland.

Amber is of a yellow color, and is composed of nearly equal portions of hydrogen, carbon and oxygen, like common vegetable resin. It burns like resin with a white flame and gives out a pungent odor. It is but little heavier than water. If