Nature and Relations of Water.

BY PROF. DRAPER.

No living thing can exist, except it contains water as one of the leading constituents of the various parts of its system. To so great an extent does this go, that, in a thousand parts of human blood, nearly eight hundred are pure water. This distribution of organized beings all over the world is to a great extent, regulated by its abundance or scarcity. It seems as if the properties of this substance mark out the plan of animated nature. From man, at the head of all, to the meanest vegetable that can grow on a bare rock, through all the various orders and tribes, this ingredient is absolutely required. Insipid and inodorous in itself, it takes on the pecularities of all others bodies; assumes with readiness the sweetness of sugar, and the acidity of vinegar. Distilled with flowers, or the aromatic parts of plants, it contracts from them their fragrance, and with equal facility becomes the vehicle of odors the most offensive to our sense.

We talk about the use of water and imagine that nature furnishes us a perenial supply, we constantly forget that in this world nothing is ever annihilated. The liquid that we drink to-day has been drunk a thousand times before: the clouds that obscure the sky have obscured it again and again.

What then becomes of the immense quantities of water, which, thus entering as a constituent of the bodies of animals, gives to their various parts that flexibility which enables them to execute movements, or combining with vegetable structure fits them for carrying on their vital processes? After the course of a few years, all existing animals and vegetables entirely pass sway; their solid constituents disintegrate and take on other conditions, and the waters, lost perhaps, for a time in the ground, at last escapes in the form of vapor into the air. In that great and invisible receptacle, all traces of its ancient relations disappear; it mingles with other vapors that are raised from the sea by the sun. From the bodies of living animals and planets, immense quantities are hourly finding their way into the reservoir.

From the forests and meadows, and wherever vegetables are found, water is continually evaporating, and that to an extent far surpassing what we might at first be led to suppose. In a single day, a sun-flower of moderate size, throws from its leaves and other parts nearly 20 ounces weight.

In the republic of the universe there is a stern equality, the breath of the rich intermingles with the breath of the beggar.

A man of average size requires a half ton of water a year; when he has reached the meridian of life, he has consumed nearly three hundred times his own weight of this liquid.

These statements might lead many to doubt whether the existing order of nature, as dependant on the waters of the sea, could for any length of time supply such a great consumption.

The human family consists probably of a thousand millions of individuals; it would be a very moderate estimate to suppose, that the various animals, great and small, taken together, consume five times as much water as we do, and the vegetable world two hundred times as much as all the animal races. Under such an immense drain it becomes a curious question what provision nature has made to meet the demand, and how long the waters of the sea, supposing none returned to them, could furnish a sure supply?

The question involves the stability of existence of animated nature, and the world of organization; and no man, save one whose mind is thoroughly imbued with an appreciation of the resources upon which the acts of the Creator are founded, would, I am sure, justly guess at the result. There exists in the sea, a supply which would meet this enormous demand for more than a quarter of a million of years.

Worcester Railroad.

The number of persons carried over the Worcester Railroad, a greater or less distance on the 4th inst., is estimated at about 9000, and the receipts were probably $3,500. This was doing a good business.

The Specific Gravity of Liquids.

As distilled water is always of the same weight at any given temperature, it is taken as the standard of comparison in comparing the weight of one body with another, except in comparing the weights of the gases when atmospheric air is taken as the standard. As it is sometimes of consequence to be able to ascertain the relative weight of a substance, and the methods of accomplishing this may be of service, first premising that it is usual to take the specific gravity at 60° Fah., to which temperature both the distilled water and the substance to be weighed must be reduced, in order to prevent a troublesome calculation. The substance to be weighed, if heavier than water is to be attacbed to one scale of a good balance by a piece of horsehair or fine wire, so as to hang beneath the pan or scale; the absolute weight of the substance is then ascertained very accurately; it is next immersed in distilled water at 60° and the beam being again brought into equilibrium the weight lost by the immersion is ascertained. The absolute weight is then to be divided by the weight lost in the water, and the result gives the specific gravity.

Suppose a substance weighing 360 grs. to lose 60 grains by immersion in water, the specific gravity of such substance will be=6 for 360—60=6.

When the substance whose specific gravity is required, is lighter than water, it may be suspended with some heavier body, and having determined the weight of the former in air, and of the latter in water, the two should be fastened together with fine thread, (not so closely as to exclude the water from between them) and weighed together in water, when it will be found that their aggregate weight will fall far short of that of the heavier body. If now the weight of the lighter body be subtracted from that of the heavier body, and the remainder be added to the weight of the former, in air, the weight of a quantity of water equal in bulk with the lighter, will be obtained; if the weight of the lighter body in air be divided by the last mentioned sum, the specific gravity of the lighter body will be obtained.

Dr. Paris gives the following example: "A piece of elm wood, having been varnished over to prevent its absorbing water, was found to weigh 920 grains in *air*; a piece of lead taken as ballast, was ascertained to weigh 911-7 grains in *water*; the elm and lead were then tied together, and were found to weigh in water only 331-7 grains, being 580 grains less than the weight of the lead alone; therefore 580 were added to 920, that is to the weight of the elm in air, which made up the sum of 1500; lastly, 920 were divided decimally by 1500, and the quotient 6133 gave the specific gravity required.

When the substance whose specific gravity is required, is *soluble* in water, some other fluid of known specific gravity must be used, which does not act upon it; alcohol, oil of turpentine, or olive oil, may in most instances be used, or in some cases the substance may be coated with varnish. When the substance is in powder, it may be weighed in the specific gravity bottle.

For ascertaining the specific gravity of liquids, a thin bottle holding 1000 grains of distilled water at the temperature of 60° is generally employed. If filled with any other liquid, the specific gravity is immediately ascertained; thus it would be found that the above bottle filled with mercury at 60° would be 13-500, which therefore is the specific gravity of mercury; the same bottle would hold 1845 grains of sulphuric acid, 1420 of nitric acid, &c., which numbers of course represent the specific gravity of these liquids.

Sometimes, in ascertaining the specific gravity of liquids a *hydrometer* is employed, but it cannot be used where great exactness is required. Where, however, a number of specific gravities are to be quickly determined, as in taking the specific gravities of spirituous liquors for the purpose of levying duties, or in certain processes of the arts, these instruments from the facility of their application become indispensable.

When Louis Phillipe read Louis Napoleon's message he exclaimed, "I am avenged."

To Manufacture Attar or Essential Oil of Roses.

This celebrated essence is obtained from roses by a simple distillation, conducted in the following mode: A quantity of fresh roses, (forty pounds for instance,) with their calyxes, but with their stems cut short, are put into a still with sixty pounds of water. The mass is well mixed with the hands, and a gentle fire is made under the still. When fumes begins to rise, the cap is put on, and the pipe fixed; the chinks are luted; cold water is put into the refrigeratory, and the receiver adapted. A moderate fire is continued; but when it begins to come over, is gradually lessened. The distillation is carried on till thirty pounds of water are drawn off, which generally happens in about four or five hours. This rose water is poured upon forty pounds more of roses, and from fifteen to twenty pounds are drawn off by the same process as before. This cohobated rose water is poured into pans of earthen ware, or tinned metal, and left exposed for a night; when the *attar*, or essence, will be found in the morning congealed and swimming on the surface of the water; it is to be carefully skimmed off, and poured into a vial. When a certain quantity has been thus obtained, the water and fecula are to be seperated from the clear essence. The first is easily done, as the essence congeals with a slight cold, when the water may be poured from it. The fecula may then be made to subside, by keeping the essence fluid by heat. They are as highly perfumed as the essence. The rose water, after all the essence has been skimmed from it, is to be employed in future operations, instead of common water.

The very small quantity of essence obtainable from the roses in India, has caused various additions to be made in the distillation, particularly sandal wood; but this adulteration is discoverable by the flavour of the sandal, and the fluidity of the oil in common cold. In Cashemire a sweet-scented grass is used as an addition, which does not injure the perfume, but impedes its congelation. The proportion of pure essence yielded by the roses is very variable, from differences in the seasons, and in the manner of conducting the process. In India, three drachms from one hundred pounds of leaves is a large proportion. From a large field there was procured only at the rate of two drachms to the hundred pounds. The color of the *attar* is no criterion of its quality. It was obtained green, yellow, and reddish, from roses of the same ground, but collected on different days. The calyxes do not impair the quality of the *attar*, nor give it a green color.

The Use of Camels.

It is a fact well known to Eastern travellers and especially to those who have visited the mountainous regions of Syria, Palestine, and the Peninsula of Sinai, that the camel is as serviceable on rough mountain paths as in the moving sand of the desert On this account the modern Arab never troubles himself with road-making. He will not even remove a stone from the middle of his path which leads to his watering-place. The dry bed of a torrent is his high road cross the mountains, and foot prints are his guides through the plains. The tough soles of the camel's feet are affected neither by the burning sand nor by the loose sharp-edged stones strewed over that volcanic mountain range which extends from the Taurus to the Indian Ocean.

Any young camel may be trained for racing and for war, although the mountain breeds are best adapted for these purposes. The camel drinks only every second day; but it may be deprived of water for three days together, without any effect upon its health and vigor. It will perform an eight day's journey with no other food that three pounds of oil-cake and a few handfuls of grain. The dromedary carries sixty pounds' weight, in addition to its rider; and it will outstrip the fleetest horse in a day's march. The "cavass" of the Egyptian Government travel on dromedaries from Cairo to Suez. a distance of ninety-three miles, in eight hours.

The common day's journey of caravans in Syria and Arabia is from 25 to 27 English miles, and the load of each camel is between four and five hundred weight. The Indian mail is conveyed from Suez to Cairo on camels in 18 hours. An Egyptian camel, amongst the tallest and strongest breeds, will carry, for a short distance—six hundred to one thousand yards—from 10 to 20 cwts.

There is no reason why the camel should not be as serviceable to man on the Prairies of Texas and the mountain region of Mexico, New Mexico, and California, as in the corresponding tracts of the Old World.

A writer in the National Intelligencer recommends a shipment of Camels from Morocco where good ones can be bought for about $30, in order to test their qualities in the new world. We think that the idea is a good one and we would like to see a trial made, at any rate.

Lawyers' Mistakes.

The following article from Warren's Book of Lawyers, will give our readers some idea of the critical correctness which is required of lawyers in the drawing up of their papers.

I myself recollect a case in which an attorney's clerk had omitted one single letter, in making the copy of a writ of capias; to be served upon a defendant, who was clandestinely going to India, owing a widow a large some of money, which she had lent him. She accidentally, however, discovered what he was about, and instantly communicated with her attorney, in such a state of alarm as may easily be conceived, He was an able and energetic practioner; and within a few hours' time, had got a capias against the dishonorable fugitive, and accompanied by an officer, succeeded in arresting the prisoner just as he was stepping into a steamboat to go to a ship, which was expected to sail from Gravesend on that day or the ensuing one. You may guess the consternation with which he found himself thus overtaken; but it scarcely equalled that with which the attorney received, early the next day, a rule to show cause why the defendant should not be discharged out of custody, on entering a common appearance, on the ground of a variance between the writ and the copy served; the discrepancy being between "Sheriffs of London" in the one, and "Sheriff of London" in the other. Eminent counsel were instantly instructed to show cause, and struggled desperately to discharge the rule; but in vain. "It is better," said the tranquil Chief Justice Tindal, "to adhere to a general rule, capable of application to all cases, than to raise an argument on every imperfection in a copy, as to the materiality or immateriality of the error, and thereby offer a premium on carelessness."

So the rule was made absolute—the defendant discharged—he went to India. I sadly fear that he has never made his appearance here again, and that the widow lost all that he owed her, and which but for the wretched mistake, she would in all human probability, have recovered. This happened nearly sixteen years ago, and coming under my personal notice, made a deep impression on my mind. I have a vivid recollection of the vexation and distress which it occasioned to the parties both lay and professional.

Only a year or two ago, a precisely similar decision was reluctantly pronounced in the Court of Exchequer, in respect to a similar blunder, the very same word! (See Moore v. Magan, 16 M. and W. 95.) Now, can anything be imagined more serious to the client and mortifying and injurious to the practioneer, than such miscarriages? Counsel, also alas, can make desperate slips of this sort.—That eminent conveyancer, the late Mr. Butler, accidently omitted a single word, "Gloucester," on drawing the will of Lord Newburgh, which deprived a lady, the intended devisee, of estates worth £14,000 ($67,900) a year.

To Cook Green Peas.

Place in the bottom of your sauce-pan or boiler, several of the outside leaves of head salad; put your peas in a dish with two ounces of butter in proportion to half a peck of peas—cover the pan or boiler closely and place it over the fire—in thirty minutes they will be ready for the table. They can either be seasoned in the pan, or after taken out.—Water extracts nearly all the delicious flavor of the green pea.

The amount of California gold received at the Mint, Philadelphia, is about $2,000,000.