vagrant; but starting a fire to-day is to put the whole community out at the fire line; they leave at home their sowing, their crops—and harvesting also; and the result has been that the man who hitherto, starting a forest fire, was simply tolerated, has now come to be regarded as a public enemy. That is the best result of the fire laws in this State.

I want to refer here, very briefly, to some remarks of President Eliot, of Harvard University. This little extract of his says: "Anyone who has traveled through the woful, treeless country around the Mediterranean, such as Spain, Sicily, Greece, Northern Africa, and a large portion of Italy, must frequently pray that our own country may be preserved from so dismal a fate. It is not the loss of the forests, only, that is to be regretted, but the loss of agricultural regions, now fertile and populous, which may be desolated from the floods that rush down from bare hills bringing with them vast quantities of sand and gravel, to be spread over the landscape. Traveling two years ago through Tuscany, I came suddenly over a fine Roman village ruin, standing over a wide border of river beach—standing 30 feet over the bed of the river, and which once had served as the basis of a populous region. The standing houses testified to the flooding capacity and strength of the waters." He said, "I have been here three or four years; and three times have I seen the river rushing over the parapets of that beach; and yet that country was once one of the richest countries of the Roman Empire. It now yields a scanty support for a sparse and semi-barbarous population. The whole region about is treeless.

"The care of the national forests is a provision for future generations; and in the maintenance of the vast industries of our country a good forest administration would soon support itself; but it should be organized in the interest of the whole country—no matter at what cost."

I do not care to speak long, only a few minutes; and I will simply state that the slides to be thrown on the screen have reference to the general aspects of the question of water evaporation. I want, just for a moment, to call your attention to the fact that all, except the first slide (Fig. 1), were made in Pennsylvania. The first one is taken from Arizona, where evaporation goes on very rapidly for a little while and then subsides, because of the removal of the water, either by flowing out of the country, or by evaporation—until it is a region practically without evaporation. Any change occurring here now in the normal condition of this country will result in upsetting the balance of nature. The excessive floods that you see on the one hand and the half dry streams on the other, show a condition which is not a normal characteristic of this country. I do not mean to say that there never were high floods before the removal of the forests began; but they come now with greater frequency than before the country was cleared. In connection with this we have been in the habit of looking upon the flood and drought as the principal factors of the forestry problem, so far as the country itself was concerned; but there is another one to which very little attention has been given. I refer now to this question of evaporation.

I have been at some little pains to make an estimate as to the amount of water evaporated, or that ought to be normally evaporated, from the Susquehanna and Juniata through Perry and Dauphin Counties down as far as Middletown; and my estimate is that there should be about 103,000,000 gallons of water evaporated during the month of July. As it now is these stream beds are more than half dry (Figs. 4 and 5) during a large part of the year. Every one of those streams that you see upon the map of Pennsylvannia there represents an evaporating basin; but as we go along, you will find that more than half of these stream beds are dry. The surface of these evaporating streams is reduced; and the consequence is that the moisture which should be going into the air never reaches it, because it has run out of the country in the form of a flood. The result is that the stream beds are simply bare; and the water which should be evaporated into the atmosphere has gone; often worse than wasted.

What does this mean to the country? When you take water and put it over a fire in a kettle, you find that heat is consumed in elevating that water up to the point of vaporization; that heat becomes latent. This is going on throughout the whole day, wherever there is water to be evaporated. If we have a large area on which the evaporation is taking place, the heat of the surrounding country is expended, to a certain degree, in vaporizing that water; and thus expended there, becomes latent,—it is so much heat lost.

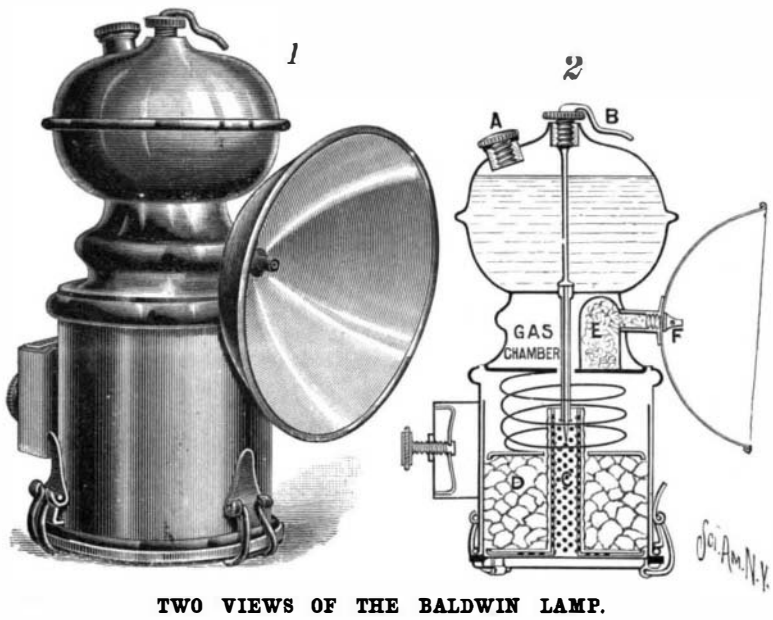
When is evaporation most rapid? During the summer months, at the very time when we would experience the greatest benefit from any change which tends to moderate the extreme heat. By the very act of evaporation, the climate is moderated and kept within tolerable limits. That is not all: not only does the evaporation of the water tend to depress, or to lower, to regulate—if I may use that expression—the summer heat, but it also prevents excessive cold in the early autumn. As the nights become cooler and the water, which has been vaporized, has been carried up into the atmosphere during the day, is, to a certain extent, condensed there, it prevents the escape of the earth's heat; so that you have, during the heat of the day, the vaporization absolutely tempering the climate and keeping it within endurable limits and, at night, preventing the escape of what remains of the earth's heat. I am, therefore, perfectly safe in stating that one of the functions of this great evaporating area, of which every one of the streams of the State is an instance, is in the interest of moderating the climate, preventing the extreme heat of the day and the extreme cold of the night.

That is not all: it is also in the interest of the growing crops. We know that a few inches of rainfall, or—to put it still more definitely—a few days very often during the month of August, or July, or September, determines the production or non-production of a lucrative crop. At the very time when our growing crops are suffering most from the effects of drought, when the evaporation from streams should be most rapid, that evaporation here is cut off by fully one-half because the surface from which the water should be evaporated is so greatly reduced, and the air is rendered so much the more dry. You take the stream as you see it here (which is by no means level full; you have dry rocks, and only a portion of the stream is covered with water). That evaporating basin is reduced by fully one-half, just at the time when most needed.

There is another thing to bear in mind: not only, then, do we have the evaporation from these streams, whose channels should be kept full, moderating the climate, and have them also giving us a cooler day and a warmer night; but we have also the power that we need for the development of our industries.

Now, then, if these grounds that have been covered with timber and, as a rule, burnt over, remain in that barren and treeless condition, it will be impossible to keep alive these forces which are to conserve the industries of the future. If an equable climate; if a fertile soil; if productive crops and if water power for the future are necessary conditions of our civilization, there is no power that we have under our control that will in the slightest degree influence these to our benefit, except the preservation of the forest. If we can keep the forest at the headwaters of these streams, we can reap the benefits I have spoken of; but there is no other single natural force that we have control of that will help us to reach these results.

There is no interest before the State of Pennsylvania, to-night; there is no cause, or bill, with which our legislature will be called upon to deal this winter, that is of as much importance to the future of this State as the immediate setting apart of the forestry reserves which were ordained by the last legislature. Men live and die; and parties and policies appear and disappear; but these questions of the waterflow of the commonwealth; the temperature in which we live; the quality of our soil, involve the future; there is nothing, I say, that is as important to the State as that these safeguards shall be set around this commonwealth, and set around it immediately.



TWO VIEWS OF THE BALDWIN LAMP.

A STORM swept over Paris recently and did some damage to the Exposition. A piece of statuary in one of the alleys became undermined on account of rain washing away the earth, and it fell. In the Fine Arts Palace sufficient allowance was not made in some instances for the expansion of glass and iron under the sun's rays, consequently many panes of glass became broken, and when the storm came, water poured into the building in several places, threatening the valuable pictures, which were moved to places of safety.

THE BALDWIN ACETYLENE BICYCLE-LAMP.

An acetylene-lamp which is noteworthy for its cheapness, cleanliness, simplicity, and efficiency—qualities not always met with in gas lamps—has been introduced by Mr. A. H. Funke, of 101-103 Duane Street, Manhattan, New York city.

The "Baldwin" lamp, as Mr. Funke terms his product, comprises essentially a water tank in the upper part of the lamp and a carbide-chamber secured to the base of the lamp by three clips. The carbide, *D*, rests upon a removable tray provided with a central, perforated tube, *C*, about which a porous fabric is wrapped. To prevent the carbide, *D*, from being jolted out of its chamber, a spring-pressed follower is employed, consisting of two, centrally-perforated disks connected by a helical spring. Water is fed to the central tube, *C*, of the carbide-tray by a small, downwardly-projecting duct provided with a valve, the stem of which is screwed in the top of the water tank, and is operated from the exterior of the lamp. An index-finger, *B*, is provided to show whether the valve is opened or closed.

The tank having been filled through the opening, *A*, and the valve opened sufficiently, water trickles into the central tube, *C*, of the tray, percolates through the porous fabric, and generates gas as it comes into contact with the carbide, *D*. The gas is filtered through cotton, *E*, and fed to a burner, located in the focus of a powerful, parabolic reflector. No glass is used; for the pressure of the gas is sufficiently great to prevent the blowing out of the flame.

Every part of the lamp can be easily reached. By releasing the clips which hold the carbide chamber in place, the lamp can be removed without soiling the fingers, merely by lifting the carbide-tray by means of the tube, *C*. The water-valve can be reached by unscrewing the index, *B*, and the burner-pipe can be cleaned by unscrewing the reflector.

The lamp weighs but 11 ounces, is only 6½ inches high, burns about 4 hours, and throws a brilliant white light for a distance of 50 feet in front of the wheel. The lamp is made entirely of brass, well finished and nickel-plated, and is furnished with a German silver reflector which can easily be cleaned and will not become yellow.

Automobile Literature.

The great demand for information in regard to automobile mechanism and power as applied to the different styles of carriages, motor wagons, tricycles and bicycles has finally culminated in the production of an illustrated work that treats of the various vehicle power methods in use in Europe and the United States. This work is illustrated with the details of the progress of the horseless vehicle from the earliest times with steam, hydro-carbon vapor, electricity and compressed air as motive powers. In its illustrations are found details of construction of the leading motor vehicles of Europe and the United States up to the present time, with half-tone process engravings of the vehicles of the leading manufacturers. The general management of motor vehicles is fully treated, and the special management of steam boilers and engines, explosive and electric motors is so extended and precise as to make this a handbook for everybody interested in the manufacture and operation of an automobile or motocycle.

The book also contains a list of patents on motor vehicles of various kinds, from 1856 to the time of publication; also a list of addresses of automobile builders in the United States, as far as known to the author at the time of publication.

In the nineteen chapters of the book, the introductory and historical chapters are full of interest to the general reader; followed by chapters on steam automobile appliances, specialties in automobile construction; steam-propelled vehicles, and illustrated with automobile carriages; vehicles with explosive motors, electric ignition devices, atomizing carbureters, operating devices and speed gears; motive power and running gear; automobile bicycles and tricycles, with detailed illustrations; electric motive power for vehicles; how to build an electric motor cab, with a scaled drawing,

Compressed air power for vehicles is also described, as well as the general management of motor vehicles of all kinds. These features make this work all that is desired by those interested in this subject. There is a miscellaneous chapter on vehicle motors and appliances, including subjects gathered too late for a place in regular order.

The author, Mr. G. D. Hiscox, is a well-known mechanical and consulting engineer, and author of an advanced work on mechanical movements, powers, devices and appliances, and on gas, gasoline and oil engines.

The book has just been brought out by Munn & Company, publishers of the SCIENTIFIC AMERICAN, and is sold at a very moderate price. For further particulars the reader is referred to our advertising pages.