the lake Quatre Cantons and the Righi, the traveler leaves the forest region and reaches Aemsigenalp at an altitude of 4,590 feet, a charming place provided with an inn and a small wooden structure containing two pumps of small size, but great power, which furnish drinking water to the two hotels situated at about 2,300 feet higher up in a rocky and arid region. The train, after taking a supply of water for the second time, traverses one of the most pleasing regions of Mount Pilatus, and then reaches the huge and fantastic blocks of the Mattalp, whence the view embraces a magnificent panorama of the Matterhorn, the enormous mass of the Esel, and the ridge that connects these summits. The railway then reaches the region of bare rock, describes a curve toward a point of the southeast ridge, and then climbs the wild escarpment of the wall of the Esel. It is difficult to imagine a bolder direction line. At an altitude of about 6,230 feet, four tunnels of 144, 180, 148, and 36 feet here and there pierce the colossal mountain sides. Between the two upper tunnels, there unfolds the panorama of the Bernese Alps. The railway then begins its last climb up a 48 per cent grade, and reaches the Pilatus-Kulm station at about 6,800 feet altitude. The mountain falls perpendicularly upon the charming country of Lucerne, beyond which we discover a vast extent of hills and valleys strewed with blue lakes, cities, and villages, and numerous rivers which, between the low eminences, shine like threads of silver. There are two hotels to receive the tourist, who, from their terraces, obtains a magnificent view over the lake of Quatre Cantons, which appears in such splendor that one does not know what to admire the most, the dark azure of its waters, or the variety of the sinuosities that they form. In order to complete the attraction of Mount Pilatus, the railway company has undertaken the construction of the road which is the most singular in Europe, and that is the Tomlishorn road running from one of the hotels to the peak of the Tomlishorn along the most abrupt of the walls of rock, and ending at a platform whence may be enjoyed a scene such as Switzerland alone is capable of presenting.

But here we are far from the railway, about which we have not much further to say, however, unless it be to speak of the intrepidity of the Italian laborers, who, sometimes suspended by ropes along perpendicular walls of several hundred feet in height, were employed in the construction of the railway, and, finally, to give the number of the travelers furnished by the last annual statistics and which amounted to a total of 44,231, 520 of whom were Americans and 12,011 English. The success of the road is easily explained. The traveler who is not very familiar with mountainous countries and with ascents finds himself here carried gently and without fatigue to the summit of one of the most celebrated mountains of Switzerland, and preserves a deep impression and lasting remembrance of the spectacle that unfolded under his eyes and of the gigantic work that permitted him to see it and that attests both the genius of man and of nature.

THE MERCURY VAPOR LAMP FOR PHOTOGRAPHIC WORK.

(*Continued from page 108.*)

the illustration, Fig. 2, shows the frame lowered to the floor and being used as a printing lamp. Mr. Pratt states that he has made sittings at night with this equipment in the astonishing space of one second. The prints are made with the same light in from 2½ to 10 seconds, according to the density of the negative, and the light only barely heats the negative, but not enough to damage it in the least. These lamps are constructed of glass tubes having metal sealing-in wires at each end. These wires lead the current to the electrodes, one of which is of mercury, and the tubes are exhausted to a high degree by means of a vacuum pump and sealed off, preventing any escape of the vapor which fills the tube.

It is claimed that these mercury vapor lamps produce the most efficient electric light known, the current consumption being about 0.4 watts per spherical candle and, under favorable circumstances, it is stated as low as 0.3 watts per candle-power. Three ordinary 32-candle-power incandescent lamps required as much current as a mercury vapor lamp of 750 candle-power and the efficiency is therefore more than seven times that of the incandescent lamp and about double that of the arc lamp.

As the vapor is inclosed under a vacuum there is no consumption of the light-giving element and, therefore, this type of lamp requires no trimming.

The mercury vapor lamp produces a light which is seemingly pure white, but is entirely lacking in red rays or nearly so, thus making it entirely unsuitable where the accurate determination of color values is necessary. The mercury vapor lamp operates with absolute steadiness and without noise and is said to be the most desirable form of light for factories, machine shops, and work-rooms of architects and draftsmen, as well as for all classes of photographic work.

The light of this lamp is composed to a very large extent of chemically active or actinic rays and is, therefore, a perfect substitute for daylight for all sorts of photographic processes. By the use of this lamp the studio for portrait photography may be located in any part of a building and the operator is entirely independent of weather conditions. The photographer can devote his attention entirely to the artistic arrangement of lights and shadows, as the time of exposure is constant at all times. The same equipment for the mercury-lamp skylight can be utilized for printing of all kinds with great satisfaction. The mercury lamp is of such shape that it is particularly well adapted for mechanical blue-printing with glass cylinders and revolving drums being, it is claimed, many times more efficient than the focusing arc lamp, while for photo-engraving work lamps of this type consuming eight amperes are said to do the work more quickly than arc lamps taking three times this amount of current.

Correspondence.

Ground Corn.

To the Editor of the SCIENTIFIC AMERICAN:

I beg leave to take exception to the statement made in the SCIENTIFIC AMERICAN of to-day by Mr. A. W. Dennis, that corn ground by steam will heat, whereas, if ground by water power, it will not. I know, from several years' experience as a practical miller, that *damp* grain ground by water power will heat if left in large bulk or even in as small a receptacle as a flour barrel, and that large bins full of meal from *dry* corn are safe even if ground by steam.

Worcester, Mass., July 30, 1904. W. H. DELONG.

Corn Grinding.

To the Editor of the SCIENTIFIC AMERICAN:

I noticed, in reading the article of Albert W. Dennis, on page 78 of the July 30 number of the SCIENTIFIC AMERICAN, the statement that corn ground in a grist mill that is run by steam will generate so much heat within itself, or acquire the heat in some way from the machinery, that it will burn and spoil if left in large bulk after being ground, but that corn ground in a mill operated by water will not heat itself or be affected in this way.

Mr. Dennis has been misinformed. The facts are these: Corn ground on a stone operated by water will heat and spoil just as quickly as a mill operated by steam power, and meal ground under the same conditions by water or steam will heat, if piled up, until after the grinding heat is out, then it is not safe to leave a very large amount piled up longer than a few days at a time. Meal ground on a dull stone will heat quicker than meal ground on a sharp stone. The kind of power does not make any difference with the heating of the meal, as any miller can tell him.

Macedon, N. Y., August 2, 1904. EDWIN YOUNGS.

Pressmen and Electricity.

To the Editor of the SCIENTIFIC AMERICAN:

I have read the article of Mr. A. W. Dennis, of Salem, Mass., on "Are Pressmen Affected by Electricity from a Belt?" and was much interested. I would be very glad to give him my experience and observations.

The kind of electricity spoken of is static or frictional and is the same as lightning. It is generated by the friction of two unlike non-conducting substances. Its cause in this case is the friction of the belts and pulleys, and it exists as a charge on the surface of the belt.

By consulting a standard work on electro-therapeutics, we find that static electricity is used much in treating nervous affections and that it requires care and skill to apply it so that the effects will not be injurious. There is no doubt that this treatment is beneficial to the nervous system when it is applied correctly, with reference to quality and quantity. The charge from a belt is irregular and varies constantly and we find that electricity applied in this manner injures the nervous forces. A person when subjected to the influence of a current or series of discharges for any length of time becomes numb and his breathing and pulse slow down considerably, even if the current is so mild as to cause no annoyance.

Once I had an opportunity to remedy a case of this kind in an electrical plant. The main shaft was driven by two wide belts and anyone passing near them invariably received a severe shock, which was a constant inconvenience. This discharge may be effectively prevented by running wires from any water or gas pipes in the building and fastening the ends near the belt, or they may be allowed to touch the belt. This allows a path for the discharge and proves an effective remedy.

With reference to steam and water ground corn meal, it is my impression that the difference in quality depends upon the speed in each case, which necessarily governs the friction. The machinery of a steam mill runs so fast that more heat is generated in the grain, which "kills" the grain, as millers say. On the other hand a water-driven mill operates at a lower speed and the quantity of heat generated is less. It all depends upon the speed.

Danbury, N. C. J. FRANK MARTIN.

Electricity and Lathe Work.

To the Editor of the SCIENTIFIC AMERICAN:

In reply to the interesting letter from Mr. Albert W. Dennis, published in a recent number of the SCIENTIFIC AMERICAN, I take the liberty of imparting the following bit of information:

While engaged in the manufacture of certain staple articles, about eight years ago, I had occasion to do considerable lathe work. The lathe upon which I worked had a twisted belt which was always strangely charged with static electricity, so much so in fact, that tufts of dust would cling to the leather. The belt would readily suck the oil from a spoon and wire-draw it into hair-like strings which would encircle the belt. Before this experience I had been a sufferer to a marked degree from nervousness or excessive nerve tension, but soon after I began my lathe work I felt a change for the better, though, I must admit, accompanied by a slight falling off in muscular vim. During the past year I found that after using a large Holtz static generator, with which to carry on experiments, considerable ozone was liberated. The gas would fill the room in a short time, so that my health became powerfully affected, causing pains in the thorax, and general distress, which fresh air seemed to relieve. If there are frequent discharges from Mr. Dennis' belts it is quite probable that a man working near them would in time become affected. More ventilation would be needed in the press-room, or else the press itself should be grounded. While the presence of an excess of ozone in the air, owing to its superiority to oxygen, may cause undue nervous tension and a subsequent reaction, I believe that a nervous system of ordinary tone would in time become affected and finally succumb, because of a continued form of electro-catalytic action on the highly sensitive animal tissue. ALBERT F. SHORE.

Brooklyn, N. Y., July 30, 1904.

Mosquito Extermination Again.

To the Editor of the SCIENTIFIC AMERICAN:

In a letter published in your correspondence column recently I find the following:

"No doubt if the malarial mosquito could be exterminated there would be an end to the propagation of malaria through this means, but it is not claimed, I understand, that the mosquito can, of itself, propagate the disease. It must first have had access to an infected person."

The mosquito theory as outlined above is an unproved hypothesis. It is true that the plague of mosquitoes was minimized by kerosene distribution in their breeding places, at Havana, and that yellow fever did not appear that season. But neither did it visit Santiago, Cuba, where the mosquitoes ran riot as usual. In Italy, when the "mosquito theory" started, the malarial insect was found abundantly, but no malaria existed, or *vice versa*. But, granting that there is some foundation for the theory of infection, it is evident that the insect procures its poison from the water where it was born, principally wet regions and shallow wells. If a microscopic quantity of poison from mosquito bites can produce malarial fever what must the ravage be when the polluted water is used, in large quantities, for drinking purposes?

In my opinion there is no such thing as malaria (bad air), in any habitable place. It is malaqua, not malaria, that causes the fever. I have known men and women to dwell in swamp regions, traditionally unhealthy, and maintain superb health simply by drinking pure artesian water and avoiding shallow well water. The Roman fever, in Italy, has practically vanished from the Eternal City since the establishment of new water supplies. Still blows the air of the Campagna upon Rome, but it brings no fever on its wings.

Killing, exterminating mosquitoes is a desirable thing for human comfort, but if every mosquito on earth were slain, the "malarial" (so-called) fever would continue as long as people drank polluted water and contaminated milk.

The "malarial" superstition dies hard, but it has not the potency it once possessed. Once the human mind generally understands that malaqua and not malaria is the enemy, the mosquito plays a very small fiddle in this problem. JAMES R. RANDALL.

Augusta, Ga., August 1, 1904.

About 8,400,000 gallons of water are evaporated daily from the salt ponds in Utah when the pumps are operated ten hours a day during June and July. In August the salt harvest begins, and the yield is at the rate of 150 tons per inch per acre. Utah produces annually nearly 60,000 tons of salt.