

draught, by which all the floating dust collected from various parts of the works is thoroughly burned up.  
—*Builders' Reporter.*

## MODERN LIGHT.

BY LEO SILBERSTEIN\*

From Grecian mythology we learn that Prometheus stole fire from Heaven where the gods guarded it jealously. Prometheus? Presumably some great discoverer, the Edison of a prehistoric age. What he then achieved may have created just as much admiration and wonder as we experience at sight of the incandescent American lamps. How have these wonders been achieved?

Even in old Homer's time tallow candles were a little-known luxury, and Ulysses returning to Ithaca to the halls of his fathers, surveys the wine stained countenances of his companions, in the ruddy glare of flickering chips and bundles of twigs. How different now! A cascade of brilliant rays radiate from flowers of fabulously wondrous beauty, with incandescent lamps in their interior, falling on facets of crystal glass, on mirrors, on gold frames, on marble statuary, and porcelain figures, covering them all with a halo of splendor. We are in the age of electricity! Electricity! The word suggests a secret revelation of the wonders that surround us—a dream of new powers with which science will invest us; a new authorization of man to assume control over nature, and to mould the conditions of his existence into richer and more attractive forms. And now, how do we produce this uncertain immaterial substance that can dazzle like the sun, and strike like lightning? Its origin is as incomprehensible as its character. The mere contact of two metals produces electricity, the friction of two bodies upon each other, whether they are hard like glass, or fluid like water, the heating of certain mineral crystals, the revolution of one glass disc upon another under certain prescribed arrangements; all these generate electricity. Everywhere in earth, air, fire, and water, we are confronted with the evidence of the presence of this uncertain force which appears only to disappear in the great body of the all-mother earth from whose womb issues all that lives or breathes; to whose womb whatever has life, or force, or energy, must sooner or later return.

For industrial and illuminating purposes, electricity is produced by dynamo machines. The fundamental idea of these wonderful contrivances is that wire spools are maintained in revolution past strong magnets. Whenever the spools approach or withdraw from the poles of the magnet, a current of electricity originates in the wire.

To keep a wire spool revolving past a magnet would be amusing child's play if there were no hindrance, and electricity might be generated very cheaply in a continuous current; but with the increase of the current in the wire spools, there is generated a corresponding antagonism between the magnetism of the iron magnet and the electricity of the wire. The wire strives to go over the shaft, but to

enable it to do so, a force is required proportionate to the force of the electricity generated. This required force is supplied by motors, steam-engine, wind-mill, water wheel, or other power.

In a central station for lighting a city or quarter of a city, we witness a whole series of direct transformation of power from one form into another. Coal is burnt, and the heat thus generated converts water into steam, and gives the steam elasticity. This elasticity operates the machine, precisely as men or horses might; in fact, it performs labor; and this labor employed in revolving the wire spools, generates or is converted into electricity. This whole series of processes may be reversed and electricity converted into heat for cooking, or into power for operating machinery. Endless are the applications of which electricity is susceptible, for electricity, heat, light, steam, the chemical union of elements are all intimately related; they are capable of performing labor precisely as labor is required for their production.

Light, although seemingly so unsubstantial and powerless, is labor, and requires force to generate it as much as wood-chopping or verse making. Every ray of light that vibrates in space is as full of force and energy as the axe of the woodcutter in its swing. Every ray that comes to us is the product of chemical labor applied to distant stars by elements such as oxygen, carbonic acid, etc., in the fierce tumult of chemical union and decomposition. Even to this day, savages generate fire by the sweat of their brow through the rapid continuous friction of two bits of wood.

The day will assuredly come when electricity will be generated directly from the heat of burning coal without the intervention of steam or dynamos; something has, indeed, been already achieved in this direction.

Berlin may be said to be the birthplace of dynamo machines as well as of the electric railway, and of other achievements in electro-technology in which department the illustrious name of Siemens is unrivaled.

The Berlin Electric Works include five central stations, in which the needed electricity for the supply of the city is generated. In March, 1889, there were in the capital 3,714 arc lamps, and 62,876 incandescent lamps in operation. For motor and illuminating purposes, the five central stations distribute about 8,000 horse-power which will shortly be increased to 18,000.

Eighteen thousand horse-power! What an enormous force. To realize its immensity one requires to institute comparison with a past like that of Egypt whose mighty pyramids were erected by human hands. Such work would be merely child's play, comparatively, in this age. Why Berlin's electric force at this moment performs labor equal to that of 70,000 men. The existing steam power of the world is estimated at 6,000,000 horse-power, equal to 50,000,000 laborers. Where now would be the progress in our culture if we were dependent on muscular force? Labor is capable of producing not only physical light but, being economized may be converted into spiritual or intellectual light; thus machinery not merely economizes production but ministers to the material and intellectual progress of the race.

\*Translation in the *Literary Digest*.