

## ELECTRIC LIGHT FOR THE EYES.

When the electric light began to be used in our shops, factories and places of amusement, it was confidently asserted by its opponents that so dazzling a light must be injurious to the eyes. The objection seemed plausible at least, although the light when diffused seemed to have the quality of bright moonlight, which is the reverse of irritating. People would persist in looking at the source of the light, and as the early lamps were far from steady, the observer's eyes suffered both from the intensity of the light and the sudden and large variations in the quantity of it. It appears, however, from the experiments recently made by Professor Cohn, of Breslau, whose name is so familiar in connection with the investigation of color blindness and other optical defects, that our eyes will be benefited rather than hurt by the new method of lighting, and it is obvious that with incandescent electric lighting the advantages will be still more marked.

While testing the influence of electric light on visual perception and the sense of color, Dr. Cohn proved, he thinks, that letters, spots and colors were perceived at a much greater distance under electric illumination than by gas light or even daylight. Compared with daylight, the electric light increased the sensation of yellow 69 fold, red 6 fold, and green and blue about 2-fold. Eyes that in daylight or gaslight could perceive and distinguish colors only with difficulty were much aided by the electric light, and the visual perception was much strengthened. In all cases of distant signaling Dr. Cohn believes that the electric light will prove exceedingly and especially useful.

**A NEW ELECTRIC LIGHT BURNER.**—For over 20 years Mr. Holland, the gold pen manufacturer, of Cincinnati, has been experimenting with iridium, seeking some method by which it might be fused. Some time ago he discovered a flux which he mixed with the iridium dust, and successfully fused it in a common crucible in the ordinary draft furnace. He cast the metal in any shape desired, and in bars of ingots weighing as much as 10 ounces. The metal thus fused and cast defies the file and resists all acids. The only mechanical way of cutting it is by friction, with a copper wheel charged with diamond dust or fine corundum. Prof. Nelson Perry, of the Cincinnati University, regards this as one of the most wonderful discoveries in metallurgy he ever knew. As soon as his discovery was made, Mr. Holland saw that iridium would be valuable as a burner for electric lights. Iridium burners two inches long, and from one-eighth to one-sixth of an inch thick were tested, but the machinery used was found to be too powerful for an incandescent light, which is all that was aimed at with the iridium burner. The light produced, however, was very pleasant, and no glass globes were necessary as the atmosphere produced an effect on the metal. Experiments are now in progress with the Maxim machine, the electric current of which can be more easily regulated. A set of burners can be furnished for about \$4, and these burners will radiate a 10-candle light, upon present calculations, for an indefinite time. Mr. Holland has patented his discovery in this country, and also in Europe.

## A NEW STYLE OF CARD FOR WOOLEN MILLS.

A new invention makes the teeth of cards a little more than one-half the ordinary length. It is claimed by this that so much stripping is avoided, and that the wire does not retain the dirt and fibers as any other teeth do; that the ordinary card teeth are longer than is actually necessary to the carding operation, which is effected by the extreme end of the teeth. The new process uses steel wire, tempered and hardened and flattened, or needle pointed wire; the cards seldom requiring grinding, are very durable, etc. The invention is of English origin.

WHY has a man lost all his teeth when one is extracted? Because he is a tooth-less man.

LIGHT AND HEAT have for some time been regarded as essentially the same thing—being only different manifestations of the same radiant energy; but it is only quite recently that this theory has been satisfactorily demonstrated. By the use of a Rutherford grating and a delicate thermal balance, Prof. Langley of Alleghany (Pa.) Observatory, recently succeeded in obtaining for the first time full and exact measurements of the distribution of energy in a pure spectrum, where no lens or prism had been used, and of fixing its relative amount as determined accurately by the wave-lengths of light in all parts of the visible spectrum and in the ultra red. The essential result is of high theoretical value. It is that heat and light as received from the sun are now experimentally proved, so far as such measurement can prove it, to be in essence the same thing. The old delineations of essentially different curves representing heat and light must be banished hereafter from text books. The old views on this subject can no longer be maintained even by European men of science, who are prepossessed in their favor. This result, fulfilling what was almost a prophecy when it was made, a quarter of a century ago, by the elder Draper, and being due largely to means which science owes to Mr. Rutherford, may, if obtained, be most fairly claimed as largely due to the two Americans whose names have just been cited.

## NEW USE OF TUNGSTATE OF SODA.

Prof. Sonnenschein, of Berlin, some time back found that when glue in thick solution is mixed with tungstate of soda, and hydrochloric acid is added, there is thrown down a compound of tungstic acid and glue, which at from 85° to 104° F. is so elastic as to admit of being drawn out into very thin sheets. On cooling this mass becomes solid and brittle, but on being heated it becomes soft and plastic. This material has now been employed as a substitute for albumen in fixing aniline colors in calico printing, and it has been tried in tanning, but produces hard and stiff leather. As tungstic acid renders fabric incombustible, its use in calico printing is a valuable feature. How far it is applicable in the manufacture of paper remains to be seen. Tungstic glue is recommended as a lute and cement. It may also have an application in the manufacture of billiard balls, knife handles, and as a substitute for India rubber.

**WHAT WE THINK WITH.**—Without phosphorus no thought. So declared a famous German physiological chemist some years ago.

That particular brain substance which he supposed to be essential to thought has heretofore been known as protogen with phosphoric acid. Considering this name not clear and definite, another German chemist has proposed for it the following precise and significant combination of 72 letters. Oxæthyltrimethylammoniumoxyhydratetylopal-methylglycerinphosphoxaur. If mental derangement is in any way due to deficiency in the elements of this highly-complicated compound, or to any snarling of its multitudinous constituents, the wonder is that anybody can ever think straight. And what a lot of it that German must have had in his head when he contrived such a name for it!

## CARBONIC ACID GAS IN THE ATMOSPHERE.

In a lecture recently delivered by Prof. Ira Remsen, at Baltimore, that scientist maintained that air may contain 1-20th of its volume of carbonic acid gas without producing evil effects—a conclusion by no means novel, but sustained by such chemists as Berzelius and Pectenoff. He stated that the most delicate tests failed to reveal the presence of carbonic oxide in the atmosphere of rooms heated by furnaces or by cast-iron stoves. According to his opinion there may be other pernicious gases in the air breathed, but there is no reason whatever why the deleterious effects should be attributed to carbonic oxide.

## BRAZING AND SOLDERING.

The term soldering is generally applied when fusible alloys of lead and tin are employed. When hard metals, such as copper, brass or silver are used, the term brazing (derived from brass) is more appropriate.

In uniting tin, copper, brass, etc., with any of the soft solders, a copper soldering-iron is generally used. This tool and the manner of using it are too well known to need description. In many cases, however, the work may be done more neatly without the soldering-iron, by filing or turning off the joints so that they fit closely, moistening them with soldering fluid, placing a piece of smooth tin-foil between them, tying them together with binding wire and heating the whole in a lamp or fire till the tin-foil melts. We have often joined pieces of brass in this way, so that the joints were quite invisible. Indeed, with good soft solder, almost all work may be done over a lamp without the use of a soldering-iron.

Advantage may be taken of the varying degrees of fusibility of solders to make several joints in the same piece of work. Thus, if the first joint has been made with fine tinner's solder, there would be no danger of melting it in making a joint near it with bismuth solder, composed of lead four, tin four and bismuth one; and the melting point of both is far enough removed from that of a solder composed of lead two, tin one and bismuth two to be in no danger of fusion during the use of the latter.

Soft solders do not make malleable joints. To join brass, copper or iron so as to have the joint very strong and malleable, hard solder must be used. For this purpose equal parts of silver and brass will be found excellent, though for iron, copper, or very infusible brass, nothing is better than silver coin rolled out thin, which may be done by any silversmith or dentist. This makes decidedly the toughest of all joints, and as a little silver goes a long way, it is not very expensive.

For most hard solders borax is the best flux. It dissolves any oxides which may exist on the surface of the metal, and protects the latter from the further action of the air, so that the solder is enabled to come into actual contact with the surfaces which are to be joined. For soft solders the best flux is a soldering fluid which may be prepared by saturating equal parts of water and hydrochloric acid (spirit of salt) with zinc. The addition of a little sal-ammoniac is said to improve it. In using ordinary tinner's solder, resin is the best and cheapest flux. It possesses this important advantage over chloride of zinc, that it does not induce subsequent corrosion of the article to which it is applied. When chlorides have been applied to anything that is liable to rust, it is necessary to see that they are thoroughly washed off and the articles carefully dried.—*Indianapolis Mechanical Journal.*

## WHY SAWS HEAT.

One whose lot it has been to hang and put into operation hundreds of circular saws, and traveling from mill to mill trueing saws and putting the machinery in order, says: "Saws heated at the center are almost invariably the fault of either the mandrel heating, or the collars not being properly turned, or sometimes the saw may not be in proper line with the carriage, or the track out of order. Saws heating at the rim and not at the center, is generally the fault of the saw leading too much into the log, causing it to bear too hard against the outside guide. The above defects are among the most prominent. Often the machinist in putting in the lug-pins of a mandrel will turn them too large, then drive them into the collar with a hammer, and swell the metal around the pins without noticing the defect. In such a case, the saw will only have a bearing at a small surface around the pins, and never fit nor hang true until the metal is chipped or filed off level with the face of the collar. Often the collars will not run true; this defect should be corrected at once."