The Artificial Light of the Future.

In his "Science Notes," in the current number of the *Gentleman's Magazine*, Professor Mattieu Williams says: "My note on this subject last July* was preceded by one on the researches of Professor Radziszewski. I now learn that he has actually separated the luminous matter of the *Pelagia noctiluca*, one of the multitude of species of marine animals that appear like little lumps of jelly, and produce the phosphorescence of the sea. He evaporated to dryness 180 specimens; and from the residue he dissolved out (by means of ether) a peculiar kind of fat, which, mixed with potassa, gives out, when shaken, phosphorescent flashes. This is exactly what happens to the living animal. When quiescent it is not luminous; but if shaken or rubbed, it flashes. I have collected and examined a great variety of these animals at different times; the most remarkable occasion being one morning after a magnificent display of marine luminosity in the Mediterranean, a few miles off the shore of Algiers. The surface of the sea was incrusted, I might almost say, with countless millions of small jelly-like creatures, of spherical, ovoid, oblong, dumb-bell, and other shapes, varying in size from a mustard seed to a pea. A bucketful of water taken over the ship's side appeared like sago broth. They were all internally dotted with a multitude of what I suppose to be germs, that would be liberated on the death and decay of the parent. The practical importance which I attach to the study of the luminosity of these creatures is the fact that they supply light without heat. The costliness of all our present methods of artificial illumination is due to the fact that we waste a largely disproportionate amount of energy in producing heat as well as light. This wastefulness may be illustrated by supposing that we obtain a pound of the phosphorescent fat of the noctiluca, and divide it into two equal halves; making one-half into candles to burn in the ordinary manner, and using the other half to give out its light by cold phosphorescence. I am not able to give precise figures, but believe that I am well within the truth in estimating that the candle would dissipate 95 per cent of the potential energy of the fat in the form of heat; giving but 5 per cent of the amount of light that the other half pound would emit as cool phosphorescence. Let us, then, hope that Professor Radziszewski will continue his researches, and discover the whole secret of both the analysis and synthesis of this fat; and that of the glow-worms, the fire-flies, etc. Now that we can supply the confectioner with the flavors of almonds, raspberries, jargonelle pears, nectarines, etc., and imitate the perfumes and the richest colors of nature's sweetest and brightest flowers, all by the chemical manipulation of coal tar, we need not despair of solving the chemical problem of transforming mutton suet, or palm oil, or vaseline into glow-worm or noctiluca fat, to be used for illuminating purposes."
—*Journal of Gas Lighting.*

GRAVIMOTOR.

The engraving represents a small vehicle which is fastened to the foot, and is so constructed that when the weight is thrown upon the foot-rest the wheels are revolved, carrying the operator forward, and when the weight is removed the foot-rest is raised to its normal position by a spring. The rest is supported by a rod which has a strap attached to its lower end, the other end of the strap being secured to a wheel mounted on the same shaft with a cog wheel, from which motion is transmitted to the shafts of the driving wheels. Clutch disks engage when the rest is depressed, and the driving wheels are revolved. This brings a spring in tension, and when the weight is removed the rest is lifted. As a motor is fastened to each foot, it is only necessary to bring the weight of the body on each foot alternately. The

HALL'S GRAVIMOTOR.

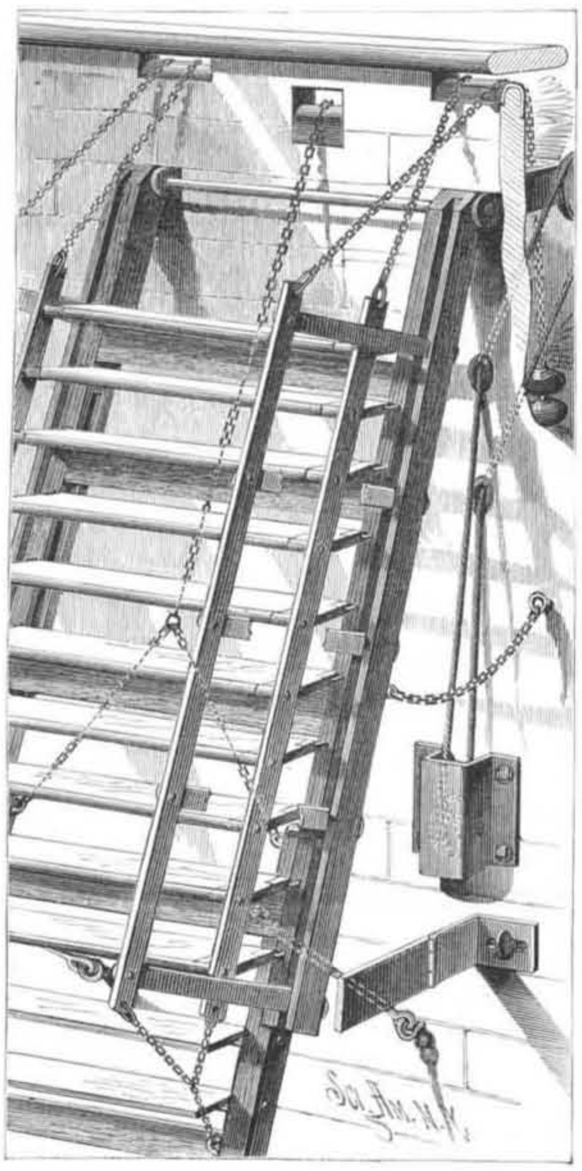
motor may be constructed with two driving wheels forward, with a single rear wheel journaled on a fork to a spring arm of the frame, above which a tongue projects to act as a brake. The foot rest is carried by a rack engaging with a cog wheel which is connected by suitable means with the shaft of the driving wheels.

This invention has been patented by Messrs. T. P. and J. B. Hall, and additional particulars can be obtained from the latter, whose address is School of Science, Toronto, Canada.

* See *Journal*, vol. xlii., p. 565.

FOLDING STAIRCASE.

An automatically folding staircase or ladder that can be used as a fire escape, for boarding vessels, etc., has recently been patented by Mr. Charles H. Chase, P. O. box 2,035, New Orleans, La. Our engraving shows the device attached to the side of a vessel. Two longitudinally grooved side bars, united by a series of transverse pieces, are hinged to the side of the vessel. Sliding in the grooves and united by cross pieces are two bars, to which is attached a chain, the upper end of which passes through an opening in the side of the ship, and is secured to a shaft placed directly before the opening. A brace rod connects the side bars with the



CHASE'S FOLDING STAIRCASE.

vessel. Pivoted to the upper edges of the side bars are steps whose upper edges are pivoted to rods having their lower ends connected by chains to the ends of the sliding bars. To the outer surfaces of the side bars are pivoted the lower ends of bars whose upper ends are pivoted to hand rails having their lower ends connected by chains to the lower ends of the sliding bars. Chains, which are fastened to the hand rails and to the rods to which the outer edges of the steps are pivoted, pass through holes in the ship's side and have weights on their inner ends. On one end of the shaft is rigidly mounted a grooved pulley, over which passes an endless chain that also passes over a pulley secured to the outer surface of the ship. A jointed locking plate is hinged to the outside, and is adapted to be swung over the lower part of the staircase.

When the staircase is to be swung outward for use, the shaft is so turned as to unwind the chain to allow the sliding bars to move downward. The weight of these bars carries downward and outward the outer end of the brace, thereby swinging the lower end of the staircase outward. At the same time the hand rails are raised and the steps swung into position. The shaft can be turned by means of a crank handle or by the endless rope from the outside. To fold the staircase the chain is wound upon the shaft, the sliding rods are drawn up, and the apparatus swung against the side of the vessel. The staircase can be made of any suitable length or width.

Plans for a New Harlem River Bridge.

Three plans for a new bridge over the Harlem River at One hundred and eighty-first Street, this city, have been laid before the Park Commissioners. The design of A. P. Boller, C.E., is for an iron cantilever bridge, 125 feet high, 100 feet wide, and having a central span 580 feet, to cost $1,500,000. The design of George McNulty, C.E., is for an arched iron bridge 132 feet high, 90 feet wide, and having a span of 543 feet; the approaches to be built of arched masonry; cost, $3,564,000. J. M. Wilson, C.E., presents plans for an iron cantilever bridge, 100 feet high, 80 feet wide, and having a span of 450 feet. There are two designs presented by Mr. Wilson, one contemplating stone piers and estimated to cost $1,193,347; the other with iron piers to cost $1,062,954.

A Couple of our Contemporaries' Opinions.

Referring to the removal of the SCIENTIFIC AMERICAN offices to 361 Broadway, the *American Garden* says, and we take pride in quoting their words, that as an "exponent of American progress the SCIENTIFIC AMERICAN stands unrivaled; and, combined with a high moral tone throughout, its educational value as a family paper cannot well be overestimated. We are glad," adds the editor, "to perceive the marked popularity and success which have compelled the publishers to remove to more spacious quarters. The new offices are beautifully lighted, airy apartments, more than fifty feet wide and one hundred and sixty feet long, and furnished with everything needful for the prompt and efficient execution of business.

"The SCIENTIFIC AMERICAN is not, as might be supposed from its name, devoted strictly to scientific matters only, but presents in a clear, practical manner the entire progress and development of our age: Science, art, literature, mechanics, industrial interests, inventions and discoveries of every kind, natural history, agriculture, horticulture, and many other topics of interest to every intelligent person."

The *Christian Intelligencer* has the following good word for us: "A great deal can be and ought to be said to commend the SCIENTIFIC AMERICAN to those who wish a popular scientific and mechanical journal of the highest character and greatest utility, edited with special ability disciplined by a long experience. It is possible that a few really valuable labor-saving inventions or important mechanical achievements in this country escape the vigilant editors of this weekly paper, but the number must be small. Besides being clearly described, many of such inventions and achievements are illustrated in pictures of unsurpassed excellence. Interesting and important scientific discoveries and facts are recorded by the hundred in the course of twelve months. At the beginning of the year we said that at least one copy should be in circulation in every school district in the United States. We still hold that opinion."

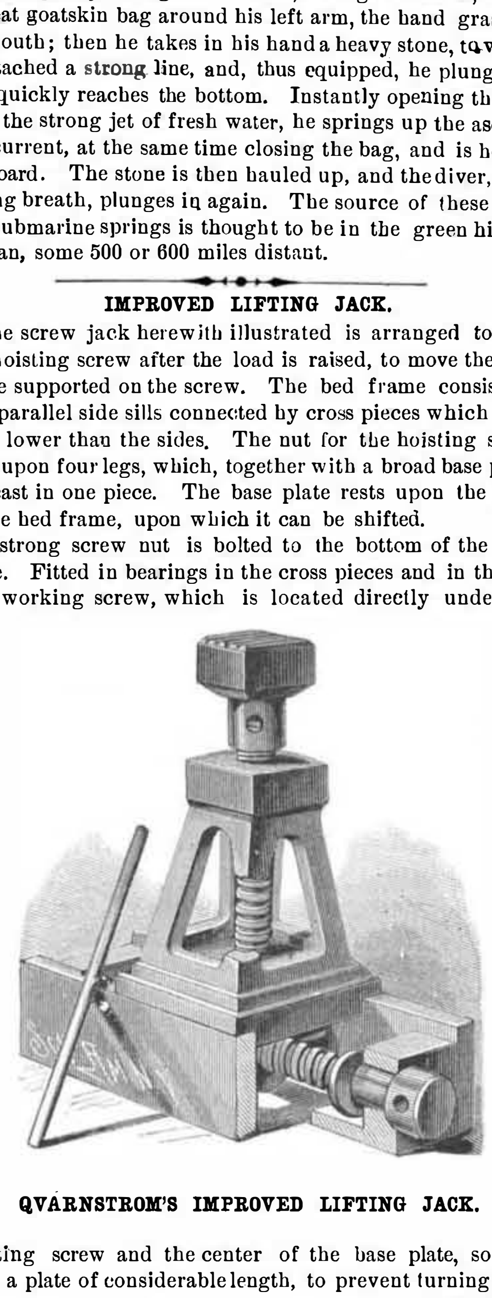
A Hot Region.

One of the hottest regions of the earth is along the Persian Gulf, where little or no rain falls. At Babrin the arid shore has no fresh water, yet a comparatively numerous population contrives to live there, thanks to the copious springs which burst forth from the bottom of the sea. The fresh water is got by diving. The diver, sitting in his boat, winds a great goatskin bag around his left arm, the hand grasping its mouth; then he takes in his hand a heavy stone, to which is attached a strong line, and, thus equipped, he plunges in and quickly reaches the bottom. Instantly opening the bag over the strong jet of fresh water, he springs up the ascending current, at the same time closing the bag, and is helped on board. The stone is then hauled up, and the diver, after taking breath, plunges in again. The source of these copious submarine springs is thought to be in the green hills of Osman, some 500 or 600 miles distant.

IMPROVED LIFTING JACK.

The screw jack herewith illustrated is arranged to shift the hoisting screw after the load is raised, to move the load while supported on the screw. The bed frame consists of two parallel side sills connected by cross pieces which are a little lower than the sides. The nut for the hoisting screw rests upon four legs, which, together with a broad base plate, are cast in one piece. The base plate rests upon the sides of the bed frame, upon which it can be shifted.

A strong screw nut is bolted to the bottom of the base plate. Fitted in bearings in the cross pieces and in the nut is a working screw, which is located directly under the



QVARNSTROM'S IMPROVED LIFTING JACK.

hoisting screw and the center of the base plate, so that with a plate of considerable length, to prevent turning so as to cramp between the sides, one screw is sufficient to shift the hoisting screw. By placing the cross pieces a little lower than the sides the base plate can be shifted along over them. The base plate is made with a hole under the hoisting screw in order that the screw may be made longer and have a greater range.

This invention has been patented by Mr. E. J. Qvarnstrom, and further information may be obtained from Mr. J. E. Hagey, of Vulcan, Mich.

Making Artificial Ivory.

The *Chronique Industrielle* gives the following description of a new process for making artificial ivory from the bones of sheep and goats and the waste of white skins, such as kid, deer, etc. The bones are macerated for ten or fifteen hours in a solution of chloride of lime, and afterward washed in clean water and allowed to dry. Then they are put with all the scraps of hide, etc., into a specially constructed boiler, dissolved by steam so as to form a fluid mass, to which is added 2½ per cent of alum.

The foam is skimmed off as it rises, until the mass is clear and transparent. Any convenient coloring material is then added, and while the mass is still warm it is strained through cloth of appropriate coarseness and received in a cooler, and allowed to cool until it has acquired a certain consistency, so that it can be spread out on the canvas without passing through it. It is dried on frames in the air, and forms sheets of convenient thickness. It is then necessary to harden it, which is accomplished by keeping it for eight or ten hours in an alum bath that has been used before.

The quantity of alum necessary for this operation amounts to 50 per cent by weight of the gelatine sheets. When they have acquired sufficient hardness, they are washed in cold water and let dry on frames, as at first.

This material works more easily and take as fine a polish as real ivory.

ZSCHIESCHE'S HYDRAULIC MOTOR.

The utilization of the motive power developed by water courses has given rise to a large number of apparatus, such as turbines, overshot and undershot wheels, etc., that have in recent times reached a high degree of perfection, and leave but little to be desired as regards performance, strength, and ease of keeping in repair.

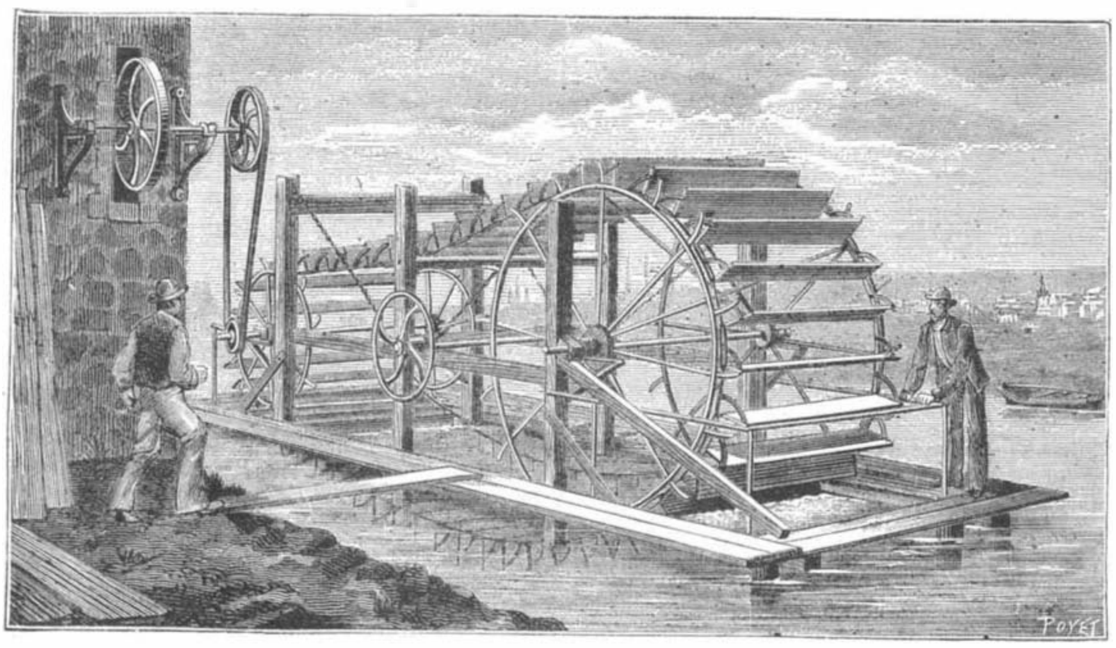
These apparatus possess but one inconvenience, and that is that they require a fall of water that is not everywhere met with, thus subordinating the selection of the mill site to the configuration of the water course. Mr. Zschiesche's new hydraulic motor, represented in the accompanying cut, requires no fall for operating it, but may be set up at any point whatever along a river that has sufficient velocity. The apparatus undoubtedly offers the inconvenience of being quite cumbersome, and of requiring the use of a motive wheel so much the larger in proportion as the velocity of the current is less, but, as the figure shows, it is mounted very simply upon a float, and can be towed from one point to another of a water course. The system consists of a wooden framework that supports two iron wheels of different diameters. The larger of these wheels is the motive one.

Its axle, which rests in bearings, can be raised or lowered by means of a windlass, and the same is the case with the smaller wheel. It will be seen that it is thus very easy to cause the wheels to plunge sufficiently deep into the current to secure a proper working of the apparatus, whatever be the level of the water.

The spokes of the wheels terminate in hooks, which serve to carry the wheels along by means of two endless chains connected by paddles. The latter are each hinged upon an axis mounted upon the chains, and can be inclined at will in such a way that, whatever be the depth that the lower part of the motive wheel reaches, the paddles will always be perpendicular to the level of the water. The paddles are held in place by means of pins that may be transposed upon a quarter circle of iron.

The lower, movable part, which consists of two chains and paddles, dips entirely under water and is carried along by the current, the result being the revolution of the wheels that support the chains. The upper part is sustained by a roller.

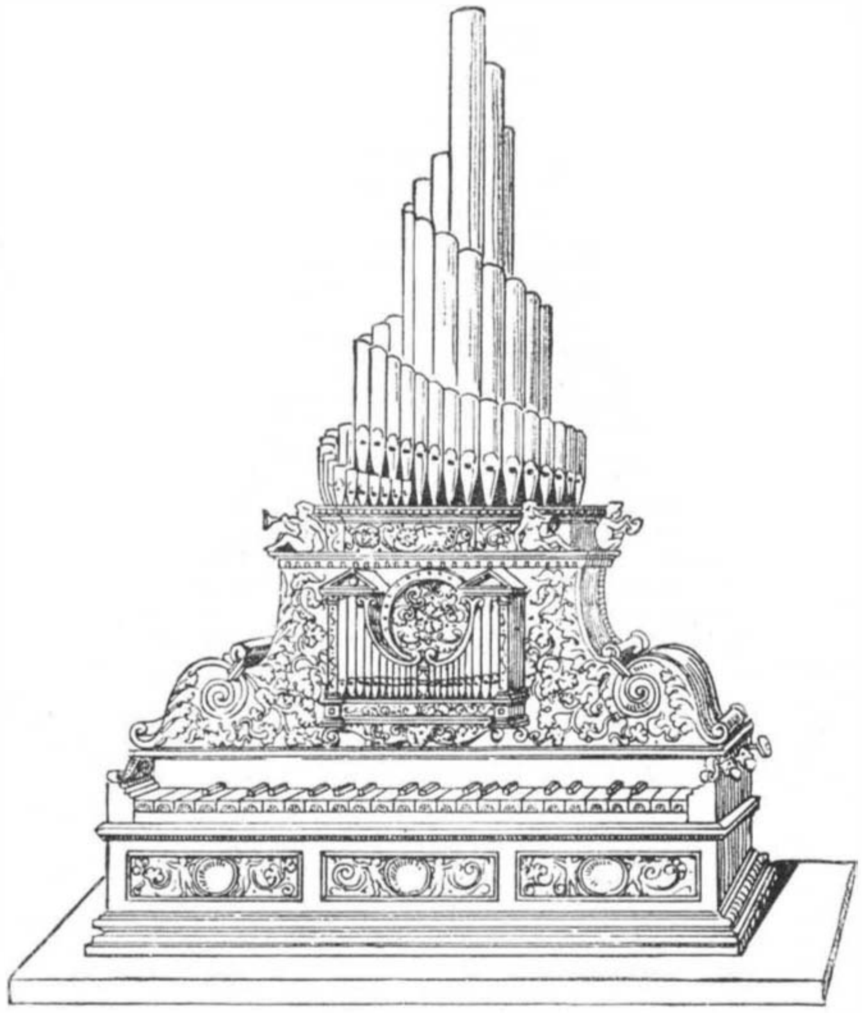
The axle of the smaller of the two wheels is provided with a pulley that serves to communicate motion to the machines and apparatus of the building, partially shown in the foreground in our engraving. The problem in regard to the utilization of the motive power of water courses is greatly attracting the attention of engineers. Now especially, that dynamo electric machines have entered the domain of industrial practice, experiments of the kind that we have here noted are multiplying upon every side.—*La Nature.*



ZSCHIESCHE'S HYDRAULIC MOTOR.

DESIGN FOR PARLOR ORGAN.

Our engraving shows a design of an organ made many years ago, in which all the pipes are said to have been made of silver We present it to our readers with the hope that it may serve as a suggestion leading to the production of something new and good in the form of musical keyed instruments. We are tired of the present stereotyped shapes of our pianos and organs. Will not somebody strike out in a new direction? A suitable design of so novel and popular a character that people must have it would be worth many thousands of dollars to the manufacturer who secured it.



DESIGN FOR A PARLOR ORGAN.

The Fun of Running an Engine.

A reporter on the Chicago *Herald* had the following interview with a locomotive engineer:

"Lots of chaps think it would be fun to run an engine," said the driver, as he stuck his head, a flaming torch, and a long-necked oil can in under his machine, "but if the most of 'em would try it, they wouldn't like it quite so well. 'Tain't everybody can run a locomotive, either, though I s'pose it's like running a daily newspaper, which I've heard tell everybody can do. Now, a nervous man has no business in a cab; no more has a careless one, or a stupid cuss. To run an engine a man must feel his responsibility, and keep his head level. I don't believe half the people know what it is to run an engine. Now, there's the machine; that's the first thing, and it has to be in good order, and stay so. A locomotive has to stand wear and tear and weather that'd knock a stationary engine into smithereens. And no matter what emergency rises—freezing of pipes, or starting of flues, a loosening of packing, or heating of journals—we've got to know just what to do, and do it right quick, too; then when we're running there's the time cards and pretty often a new one; and the train orders—they are a life and death and reputation to us, and to read 'em correct and live up to 'em gives us no end of anxiety.

"Bet I've read a train order over a dozen times an hour—I am always so afraid of making a mistake or forgetting. You know the consequence of even a little mistake, sometimes. Then there's the signals to watch, the conductor's gong overhead, steam to keep up, time to make, whistle posts and crossings to look out for, bad spots in the road to be careful on, and along with all this there's the track ahead of ye which your eyes mustn't leave for more'n five seconds. There's the brakes, too—one is always worrying about them. I don't s'pose everybody knows, either, that we have to be mighty careful when we come to the top of a grade. You see in going up she labors hard, and as soon as she begins to descend she makes a rush, and there's the danger of breaking your train when the rear cars are still dragging on the up grade. This danger is especially great on freights, but no good engineer fails to shut off some of his steam when his engine reaches a summit. It isn't every fool can run a locomotive."

Ethylene.

Before the Chemical Society on the 17th of April, Dr. P. F. Frankland read a paper on the influence of incombustible diluents on the illuminating power of ethylene. The present communication forms a sequel to a paper read by the author on the illuminating power of ethylene when burnt with combustible non-luminous diluents (Chem. Soc. Jour., Jan., 1884). In all cases the gases were consumed from a Referee's burner. Great care was taken to insure the purity of the ethylene and the diluents—carbonic anhydride, nitrogen, oxygen, and atmospheric air—employed. The author records his observations in a series of tables and curves. He sums up the principal results as follows: Mixtures of ethylene with the incombustible diluents carbonic anhydride, nitrogen, aqueous vapor, and atmospheric air, possess a lower illuminating power than pure ethylene. In all mixtures of ethylene with either carbonic anhydride, nitrogen, or aqueous vapor, the intrinsic luminosity of the ethylene is reduced. In mixtures of ethylene with atmospheric air, the intrinsic luminosity of ethylene remains unimpaired until the air forms about 50 per cent of the mixture.

Mixtures of ethylene with oxygen in insufficient quantity to form an explosive mixture possess a greater illuminating power than pure ethylene, the intrinsic luminosity of the ethylene being greatly increased. The disilluminating effects of carbonic anhydride, nitrogen, and water vapor are due partly to dilution and partly to refrigeration, *i. e.*, the cooling occasioned by the introduction of inert gas into the flame; this refrigeration is proportional to the specific heats of the gases, but in the case of the carbonic anhydride and aqueous vapor it is augmented by the absorption of heat which takes place in the dissociation of the aqueous vapor and in the reduction of the carbonic anhydride to carbonic oxide. Of the four diluents, carbonic anhydride, nitrogen, aqueous vapor, and atmospheric air, the first is the most and the last is the least prejudicial to the illuminating power; nitrogen and atmospheric air, however, become more equalized in their effects as the proportion in which they are present increases, complete disillumination of the ethylene being effected by the same proportion of each.

Bartholdi's Statue of Liberty.

A representation of this statue, as it will appear in place on its pedestal in New York harbor, has been published, as a large colored lithograph, by Messrs. Root & Tinker, of this city. The picture showing the proportion of the statue to the pedestal, with some view of the surroundings, gives a good idea of the whole as a work of art. The pedestal will be 177 feet 9 inches high, and the statue is 151 feet 2 inches, making the top of the torch 328 feet 11 inches above high water level.

THE latest novelty in advertising is a patent medicine manufacturer advertising for bald men who are willing to have advertisements painted on the tops of their heads, "for a high pecuniary recompense."