The gasometer was erected about thirteen years ago. The columns, which were of cast iron, show numerous old cracks and flaws in the iron, indicating that the contractor had done his work very imperfectly. There were no braces or stays at the base, and, considering the bad material and the careless construction, it now seems strange that the structure stood as long as it did. Gasometers are strengthened at the base of the columns with extra braces of wrought iron.

Connection with the mains of the Newark Gaslight Company has already been made, and Mr. Smalley promises that to-night no part of the city shall suffer from want of gas. Fortunately the new gasometer in Orange is ready for use, though it has not yet been used.

About sixty days will be required in which to rebuild the gasometer. The columns are always kept ready by the contractors, and they will be put up immediately. The main delay will be in building the holder.

Harrison was brightly illuminated by the burning gas. At the time a number of firemen were in the engine house, and they hastily made a start to roll the apparatus before they discovered their error.

The flame from the gas was witnessed by many residents of Roseville, Orange, Montclair, and many other elevated suburban places. It burst upon the stormy sky in a broad red glare, and seemed like an enormous cloud sweeping with lightning rapidity at the houses. Many women were frightened, as even at two miles distance the flame seemed to dart at the windows, and during a moment rooms in which no lights were burning were brilliantly illuminated. The time during which the flames were seen could not have exceeded one minute. They disappeared as suddenly as they came.

THE COMBINATION GAS MACHINE.

Within the past ten years great improvements have been made in the construction of the special type of illuminating apparatus popularly known by the name of "gas machines." In general terms, these devices are designed to produce a gaseous illuminant, consisting commonly of air charged with the vapor of one of the volatile commercial products of petroleum The material used for this purpose is uniformly that which is known as gasolene, and the vapor laden air is distributed and burned precisely like coal gas. The conveniences which such automatic gas generators afford to those living remote from cities, or in towns and villages where coal gas is not used, by placing the luxury of a brilliant illuminating, gas at their disposal, made these machines very popular from the time of their first introduction, now over twenty years ago. It required, however, a number of years, and numerous improvements in important details, to entirely obviate certain serious objections that were urged against them. These related particularly to the disposition of the inflammable gasolene from which the gas was generated, and other less essential points affecting the safety of the apparatus under all the possible conditions of actual use.

These objections at the present day have been very satisfactorily met in many forms of these machines now in use. The modern gas machine, where ordinary care and intelligence are exercised in its use, answers every reasonable requirement that could be demanded on the score of safety.

A typical machine of this class, embodying in its design and construction all the improved features above alluded to, is that known as the "Combination" gas machine.

The apparatus consists substantially of three parts: First, the air pump and its mechanical attachments, the object of which is to force the current of air over or through the volatile gasolene; second, the carburetor, in which the gasolene is stored in such a manner as to expose a large evaporating surface, so that the air forced through it by the pump shall readily charge itself to saturation with the hydro-carbon vapor; and third, the system of distributing pipes, through which the vapor laden air—now an illuminant—is conveyed to the burners. The air pump consists of a metallic chamber, strongly built and air-tight, containing a meter wheel working in water, and deriving its power from the gravitation of a heavy weight suspended from the ceiling. This pump is usually placed in the basement or cellar of the building to be lighted. A pipe conveys the air into the top of the pump chamber, whence it is conveyed by the meter wheel from the side of the chamber through a suitable connecting pipe provided with a governor for regulating its pressure, and also a check valve, into the carbureting chamber. This portion of the machine is located at a distance of from 20 to 50 feet from the building. It consists of a flat cylindrical chamber, capable of containing a large supply of gasolene; and the liquid is so disposed therein as to afford a great length of evaporating surface over which the air forced by the pump must pass. For additional security, the carburetor is buried to a convenient depth in the earth, and surrounded likewise with a water chamber. From time to time (once, say, in three or four months), as may be necessary, the carburetor is filled with fresh material through a pipe leading from the buried chamber to the surface of the ground, with which communication is established through a flexible tube with the barrel of gasolene. By this system of construction the refilling of the carburetor is accomplished without risk or danger.

From the carburetor the vapor laden air, now suitable for illuminating purposes, is forced through the system of pipes communicating with the burners throughout the building to be lighted, in the usual manner as with coal gas. It will be understood from the foregoing description that the pump can only operate when one or more of the burners are in use; when these are closed, the back pressure on the meter wheel holds it immovable. The air pump is made amply large, so as to obviate the necessity of frequent winding up of the weight—once or twice a week is as often as this operation need be repeated. A governor is provided near the side of the air pump, whose office is to automatically regulate the pressure upon the burners; a check valve is also provided to prevent the back flow of gas from the carburetor to the pump in case of accident or breakage. A hand-wheel on the pump shaft for holding the pressure, enables the machine to be wound up while the lights are burning. The burial of the carburetor in the earth outside of the building, and surrounding it with a water tank, has two advantages. It obviates all probability of risk or danger in connection with the storage of a large amount of gasolene, and the refilling of the chamber; and it serves to keep the temperature of the liquid practically uniform at all times of the year. This feature is a point of considerable importance, as the quality of the gas furnished by such machines will vary very greatly when the gasolene is exposed to atmospheric changes. By this disposition of of the carburetor, the liquid is maintained at nearly a uniform temperature, the amount of evaporation kept at about the same rate, and the quality of the gas is caused to vary very little, summer and winter.—*The Manufacturer and Builder.*

THE HERCULES BEETLE.

(SEE PAGE 93.)

The Hercules beetle, (*Scarabeus hercules*) is one of the largest and best known of the beetle family. It is found in Guadeloupe, Colombia, Martinique, and occasionally in the neighborhood of Rio Janeiro, and varies slightly in size and color in these different places. In Guadeloupe are the largest specimens, possibly the best developed horns, and its curious habits have long attracted the attention of naturalists and travelers.

The male beetle is of a shiny black color, with long claw-like horns, covered on the under side with reddish-grey hairs arranged like a brush. The wing-cases are greenish-yellow, spotted with black, in the living insect, but occasionally in preparing them for collections, the wings absorb a black substance from the abdomen and turn gray. This may be remedied by washing in benzine, which will restore the yellow color.

The male is over three inches long, including the horn, which, with the corselet, of which it is the elongation, measures nearly one-third of the whole length.

This insect may often be seen to seize the young shoots or branches of a tree between his strong horns, (see illustration), and then turning rapidly around and around, by the aid of his wings he cuts off the branch.

This revolution is so rapid that when the branch breaks off the beetle is often thrown to the ground with great force.

It has been supposed that he does this to obtain the sap of the tree, though his mouth would seem more suitable for devouring the green leaves.

The female has no horns, so it must be discovered by observation in what way she is able to obtain her food. She differs in other ways so much from the male that she might at first sight be supposed to belong to a different species. She is much smaller and has brown hairy wing cases, very rough and knobby on the shoulders. She deposits her larvæ in the trunks of decayed trees, where she forms a shell of woody *débris* glued together for their protection.—*La Nature.*