

## COAL CONVEYER AT WEEHAWKEN, N. J.

The present illustrations were taken from the coal pockets of the New York, Ontario & Western Railroad Company, at Weehawken, N. J. The coal-conveying apparatus consists of a number of steel scoops connected to a chain, which passes along the bottom of a trough to the top of the dock, where the coal is drawn over and dropped into the pockets. The dock containing the pockets is about 500 feet in length and about 50 feet in height. The pockets, which are 60 in number, are made of heavy yellow pine timber. They are 12 feet square and run from 15 to 20 feet in depth. They are lined with sheet iron and hold from 40 to 80 tons each. The conveyer or Dodge chain is 1,750 feet in length and travels over a space of 875 feet. Connected to this chain, about 16 inches apart, are 1,000 steel scoops, 20 inches in length and 8 inches in depth. From the end of dock to the starting point are a number of sprocket and idler wheels placed about 18 feet apart. These wheels, when chain is in motion, are formed so as to pass through the central link between the scoops, keeping them in place and also driving them ahead. The trough over which the coal passes is made of 8 foot lengths of sheet steel. It is three feet in width across

conveyer has taken up and dropped into the pockets 69 car loads of coal in 10 hours.

## Antiquity of the Lens.

Monsieur Edouard Fourdrignier has an article in the *Photo Club de Paris*, entitled "A Few Words on the Knowledge of Optics Possessed by the Ancients," in which he says: "Looking back at the works written by the ancients, we may discover very many ideas and germs which we, in the present century, presumptuously imagine that we have been the first to discover. With regard to photography, it is certain that the application of the dark chamber and the lens and also the sensibility of certain substances to light was well known."

With regard to the antiquity of the lens the author says: "If we are to believe C. P. Gaubil, quoted by M. De Paravey in his 'Chronologie Chinoise,' the Emperor Chan, who reigned 2283 B. C., used enlarging lenses in the form of a telescope in order to be able to get a better view of the planets."

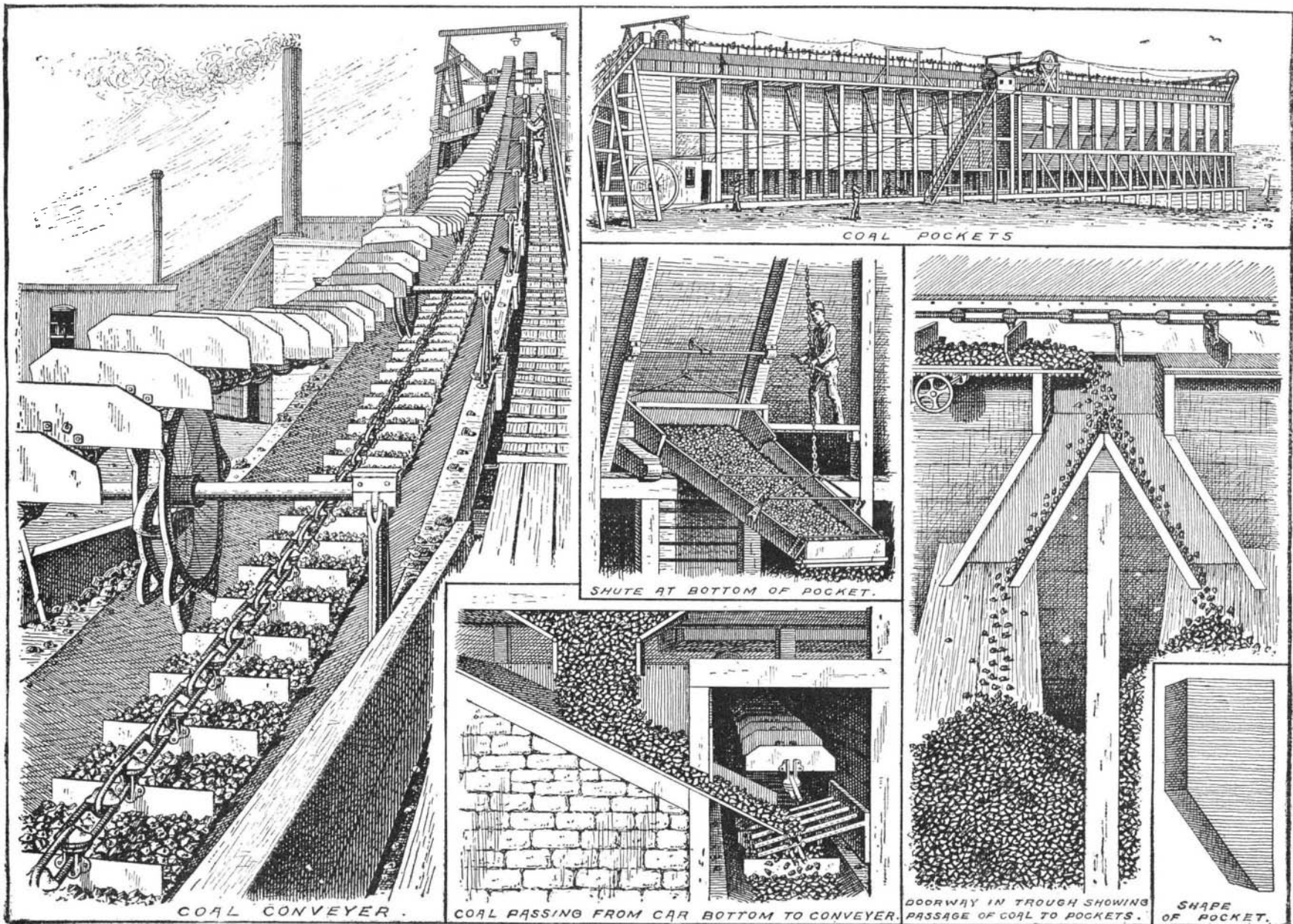
The use of lenses has also been traced to the Chinese moralist Confucius, 748 B. C. A glass case in the Assyrian section of the British Museum contains a piece

obscura, states: "If you know how to combine a convex and a concave glass, one of each sort, you will see far and near objects larger and clearer."

It was not, however, says the *Photographic Times*, until the time of John Dollond (born 1706, died 1761) that perfect lenses were found, for he it was who discovered the method of achromatizing them by combining glasses of different dispersive power.

## Value of Water Meters.

The value of meters in preventing the waste of water is shown in a recent report by Mr. G. Hillyer, the president of the Atlanta Water Works. In March, 1885, the city contracted for a supply of coal for the succeeding year; the quantity being estimated from the amount burned during the preceding twelve months. The city was then pumping 6,000,000 gallons of water a day, and nobody had enough. A number of serious fires broke out, at which the firemen were seriously hampered by lack of water. Consequently, as a matter of absolute necessity, meters were put on. The consumption at once fell off to 1,500,000 gallons, and everybody had sufficient. Moreover, the coal bought in March, 1885, lasted through the remainder of the



THE NEW YORK, ONTARIO AND WESTERN RAILROAD COMPANY'S COAL CONVEYER, WEEHAWKEN, N. J.

the top and about 18 inches in depth and tapers down to 1 foot at the bottom. The bottoms of the scoops are made the same shape as the trough, so that no coal can escape when in motion. The coal first passes through the car bottom down into a steel hopper, where by means of a small door or gate it is passed into the conveyer as fast as required. Each scoop as it passes by the hopper takes up about 50 pounds of coal and travels at the rate of 175 feet per minute. About every 25 feet in the trough over the pockets are movable doorways, which can be opened and closed by means of gearing wheels connected to slotted bars attached to the bottom of the doors. As the coal is drawn forward along the trough to an open door it falls down into a double wooden chute, each leading to a separate pocket. When the pockets are filled the door is closed and the stream of coal is drawn along and dropped into other pockets. At the bottom of each pocket is a door or gate from which the coal can be passed to canal boats and barges by means of 22 foot steel chutes. These chutes work on hinges and can be raised and lowered to any elevation. A canal boat carrying about 250 tons can be filled in about two hours. The gate is raised and lowered by means of a lever or crank. The conveyer is driven by a wire cable connected to two 8 foot and two 6 foot drive wheels. The wire cable is  $\frac{1}{2}$  inch in diameter and is 1,140 feet in length. The engine is 100 horse power, carrying 80 pounds of steam. The

of rock crystal formed into the shape of a plano-convex lens  $1\frac{1}{2}$  inches in diameter and  $\frac{1}{8}$  inch thick. This was discovered in the ruin called Nimroud. It gives a focus of  $4\frac{1}{2}$  inches. According to Sir David Brewster, this lens has been designed for magnifying purposes. The date is about 700 B. C.

Plutarch speaks of instruments used by Archimedes "to manifest to the eye the largeness of the sun." Euclid's treatise on "Optics" appeared about 280 B. C. Other notices of lenses may be found scattered through the pages of antiquity, until the revival of science and learning in the twelfth century, when Alhazen is credited with having written on the refraction of rays and the magnifying power of lenses. Vitellus, a Pole, also wrote a treatise on lenses about 1270. The invention of spectacles has, however, been credited to Roger Bacon (1250), but Pliny mentions that Nero, who was myopic, used glasses when he watched the fights of the gladiators.

To prove the knowledge of the lens and dark chamber possessed by the ancients, M. Fourdrignier quotes two extracts from Aristophanes' comedy of *Nuées*, in which, during a conversation between Socrates and Strepsiades, an allusion is made to similar contrivances.

The first lenses of which it is possible to discover any reliable record are those invented by the Florentine Salvino degli Armati, who died 1317.

Baptista Porta (1560), the inventor of the camera

year, all 1886, and until July, 1887. In 1885, before the meters were applied, and while there were only 1,500 services, the consumption of water was 6,000,000 gallons daily. Now, with 4,533 services, all metered, the consumption is only 2,590,000 gallons a day, or only about three-sevenths as much. The superintendent (Mr. W. G. Richards) states that the meters are the property of the landlord; the city keeping them in repair so far as the labor is concerned—the new material being charged to the owner. The water department commenced this system of repairs in November, 1892; and in the first six months they repaired 265 and condemned 26 meters. Mr. Richards believes that the principal cause of meters getting out of order is that they are often too small for their duty; the five-eighths inch meter being the size generally put in to measure the average domestic supply. The proportion of larger meters that get out of order in Atlanta is very small.

## The Maxim Machine Gun.

The long and close competition between rival machine guns has resulted in favor of the Maxim. It has been decided that hereafter, in the offensive equipment of British war vessels, the Maxim gun shall take the place of the five-barrel Nordenfolt and Gardner guns. The first to carry the new guns will be the cruiser *Bonaventure*, and she is to have four of them in her armament.