

### A NEW DEVELOPMENT IN MACHINERY FOR ASPHALT PAVING.

Since the asphalt street has come to be generally acknowledged superior, in essentials, to all others, the adoption of asphalt for paving purposes has become the rule in all of the more important cities of the United States. The result of competition among contractors for that kind of pavement has been to extend its use, and, at the same time, greatly reduce its cost. Whether or not competition has been largely prevented in the past, it appears quite certain that at the present time any contractor having the necessary experience and capital may include asphalt paving with his other business. Until the present time, however, the asphalt paving contractor has been compelled to limit the field of his operations to only the cities and larger towns of the country, it being practically out of the question for small towns to obtain this pavement, on account of the increased price made necessary in order to cover the cost of a plant which would have to be erected for the purpose of manufacturing the material from which the pavement is made. These being the conditions, it naturally follows that a paving plant which could be easily transported from place to place would open at once a vast new field of work in the paving industry. A portable plant, for practical field work, must combine all of the essential features of the regular stationary type of plant with extreme portability and compactness. It must be simple as possible in its mechanism, without the sacrifice of utility. It must be self-contained and operated with at least as few hands as the ordinary stationary plant. It must be well made and durable, constructed to withstand the movement and jarring of railway transportation without injury. Such a plant, it is claimed, is the one which is shown in the accompanying illustrations and which is the invention of Frederick A. Hetherington, of Indianapolis, Ind. It is known as the Hetherington railway asphalt plant. In the invention of this plant it was the aim to produce a traveling apparatus that would be well adapted for operating upon small contracts.

Although the inventor had only hoped, originally, for a working capacity of from 900 to 1,000 square yards of pavement per day, actual field work this season has demonstrated that, as at present constructed, the capacity is from 1,500 to 1,800 square yards per day, and that, by the modification of certain elements of the plant, its capacity may be readily increased to any desired amount. The plant is complete in itself. It contains all of the machinery that the paving contractor requires, excepting his steam roller and street tools. There are no sheds or buildings to erect, yet all parts

are amply protected from rain and sun. At the end of the season's work the plant may be finally closed and locked and may stand fully protected without other cover than is provided in itself.

One of the accompanying illustrations shows the

placed the mixer. This is the machine that mixes the required quantities of hot sand, asphalt and carbonate of lime, that in combination form the cement for pavements. Still higher in this tower is situated a rectangular steel box of considerable size which is called

the hot sand storage bin. Beneath this bin, and suspended just above the mixer, is the measuring box, and it contains, when filled, the requisite amount of sand for one charge of the mixer. This feature is in itself a marked improvement over the old method which still prevails in the great majority of the asphalt plants about the country, whereby the hot sand is shoveled by hand into a wooden box that will hold just the quantity required, and is then transferred to the mixer by means of some sort of a track or trolley.

Within the sand storage bin overhead is a revolving screen or sieve. It is the office of this screen to separate the gravel and coarser particles from the sand that is to be used in the mixer.

The two cars are called, respectively, the melting car and

the drier car. On one end of the drier car is established the power plant, which consists of one steel boiler of the locomotive type and a steam engine. Besides this machinery there is a steam pump for pumping water and another which is the air compressor. At the other end of this car, and occupying about one-half its length, is the sand heater or drier. This apparatus is the most important element in the whole plant, and its duty is arduous, for it must deliver to the hot sand elevator eight cubic feet, or 800 pounds, of hot sand every three minutes, at a temperature of not less than 310 degrees.

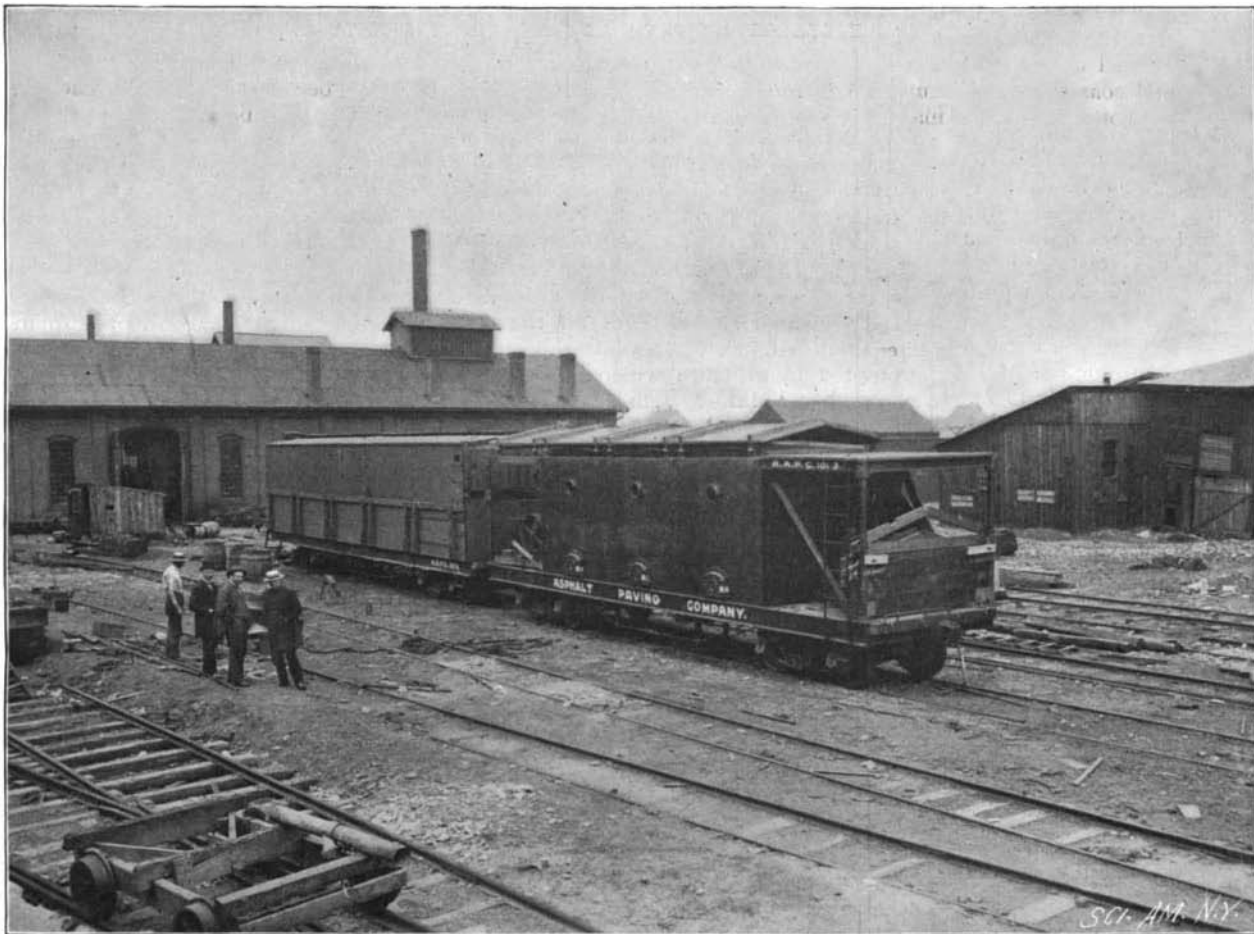
Upon the melting car are established several large kettles and a cylindrical tank called the agitator.

These kettles and the agitator, taken together, will hold, when charged, about eighteen tons of melted asphalt. Proper furnaces are provided for melting the asphalt. About the kettles are broad platforms upon which the workmen stand while at work. The arrangement and construction of these platforms is twofold. While they form the floors for the workmen while the plant is established for service, when it is closed for shipment they fold back over the kettles and make the roof of the car.

Located about centrally of the drier car, and projecting from one side, is the cold sand elevator. This is a link belt elevator carrying metallic buckets. Its office is to deliver the sand from the pile at the side of the car, up and into the receiving end of the

sand heater. The construction and novel features of this sand heater cannot at present be described, for the reason that they form the subject of another invention, patents for which are still pending.

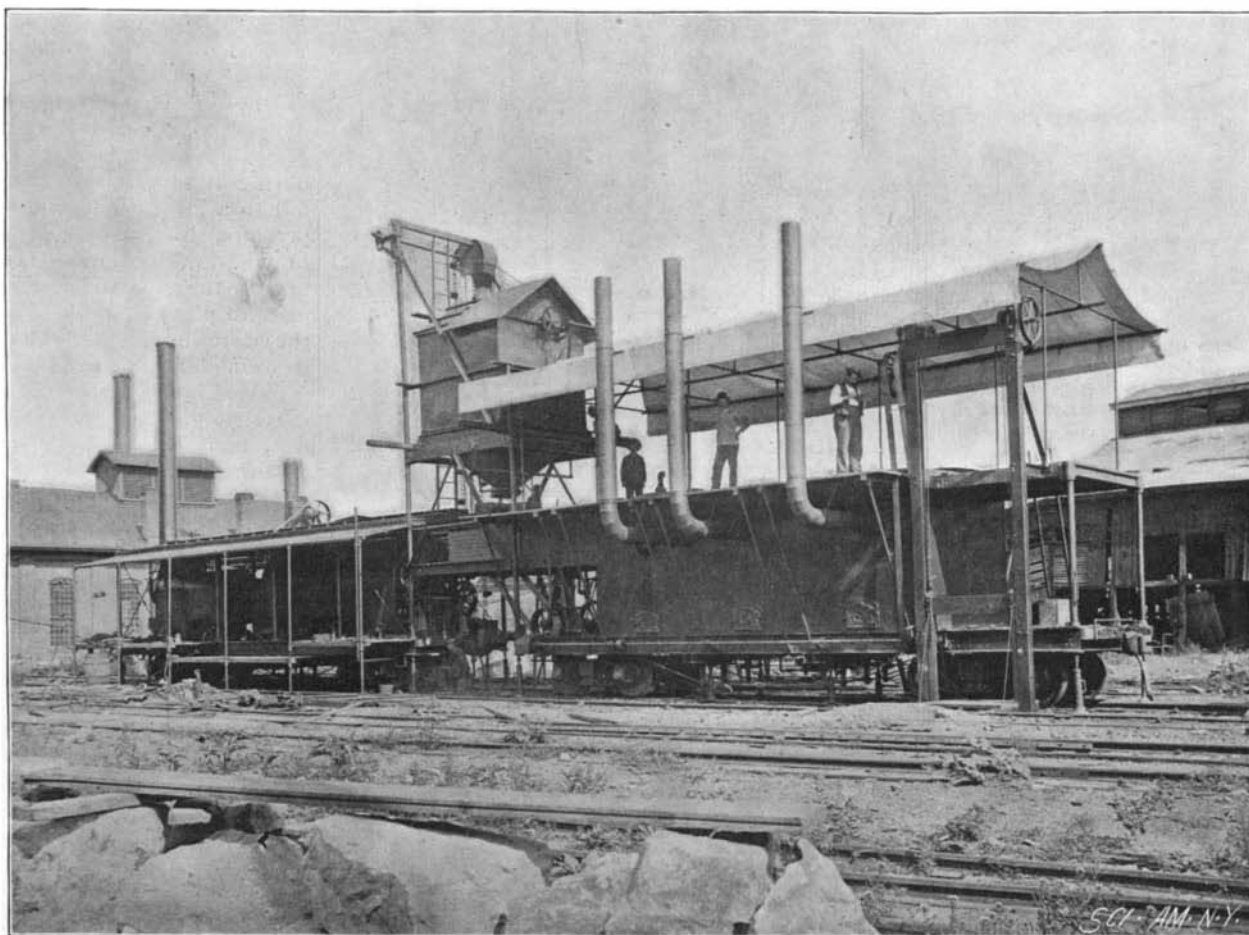
OPERATION OF THE PLANT.—Between the adjacent



PORTABLE ASPHALT PLANT READY FOR TRANSPORTATION.

plant set up for operation; the other shows it as it appears when packed for transportation. All of the parts that are shown in the second illustration, such as smoke stacks, tower structure, sand bin, etc., are securely packed away in the plant itself, as shown in the first illustration. All such parts are readily detachable, being either screwed or bolted together. But thirty hours are required in making the outfit ready for work; it may be dismantled and packed for the road again in twenty hours' time.

The principal invention which has been developed in the construction of this plant is the central tower, which is constructed of comparatively light weight tubing and steel beams. This tower is situated



PORTABLE ASPHALT PLANT IN OPERATION.

centrally between the two cars, which are placed end to end upon the tracks: it is connected to, or rather built upon, the adjacent corners of the cars. At a distance of about nine feet from the ground the tower standards support a platform upon which is

ends of the two cars, and beneath the mixer, is a passageway through which a team of horses may be driven. The operation of the plant is described as follows:

Sand is shoveled from the supply pile into the buckets of the cold sand elevator; by them it is delivered into the sand heater, from which it emerges, very hot, into the boot of the hot sand elevator. By means of the hot sand elevator, the sand is carried up into the revolving screen, where all gravel and coarse particles are removed, and it then falls into the hot sand storage bin, down through which it finally passes, by means of the measuring box, into the mixer. While this sand operation has been going on, the operator at the melting car has opened a valve in a large pipe which projects from the agitator, and has filled a steel bucket with a certain amount of asphalt. As the operator at the mixer lets a charge of hot sand fall into the mixer, the melted asphalt is run from the agitator to the mixer on a short trolley and is poured into the tumbling and tossing mass of hot sand, into which has previously been dumped the required amount of carbonate of lime. The whole batch is then allowed to mix furiously for a short period of time, and then the operator at the mixer pulls a lever which opens a door in the bottom of the mixer, and the whole mass, or batch, as it is technically called, falls into a wagon which stands beneath to receive it. This is the substance that may be seen upon the streets wherever an asphalt pavement is being laid.

The cars upon which this railway plant is established are constructed entirely of steel and are of especial design; they are equipped with air brakes as required by law, and also all other fittings and attachments, including automatic couplers, according to master car builders' standards and regulations. As packed for transportation the plant is of ordinary freight car dimensions and weight and passes all bridges and tunnels. Three of these plants have been built during this summer and their success has been so marked that it is expected that many will be in use in different parts of the country within another year. This railway asphalt plant is manufactured by Hetherington & Berner, of Indianapolis.

#### VICTORIA REGIA.

Several attempts have been made at Prospect Park, Brooklyn, to raise the Victoria Regia from the seed, but they have failed. The plant illustrated in the accompanying engraving was procured at Philadelphia. It has grown with great rapidity, and now, with its ten leaves, the blossoms and the buds, nearly fills a large lily pond. Our illustration shows the leaves in different stages of development and decay. Several of the leaves are perfect; one or two have broken down around the edges, and a new one at the left is unfolding by unrolling at the edge. The leaves are upturned at the edges like a pan, and underneath is a strong network joined to the stem five to ten feet long. The leaves are four to five feet in diameter. They have been grown to double that size in the Royal Gardens at Kew, where they are grown under glass, and the water in which they are propagated is kept at a temperature of about 80°.

The Prospect Park specimen is growing in one of the out of door lily ponds which is furnished with heating apparatus concealed from view, and arranged to keep the plant at the required temperature. Much anxiety was felt while the bud was developing, lest a chill wind should blast the tender bud, but the weather was propitious and the plant and flower have been seen by admiring thousands.

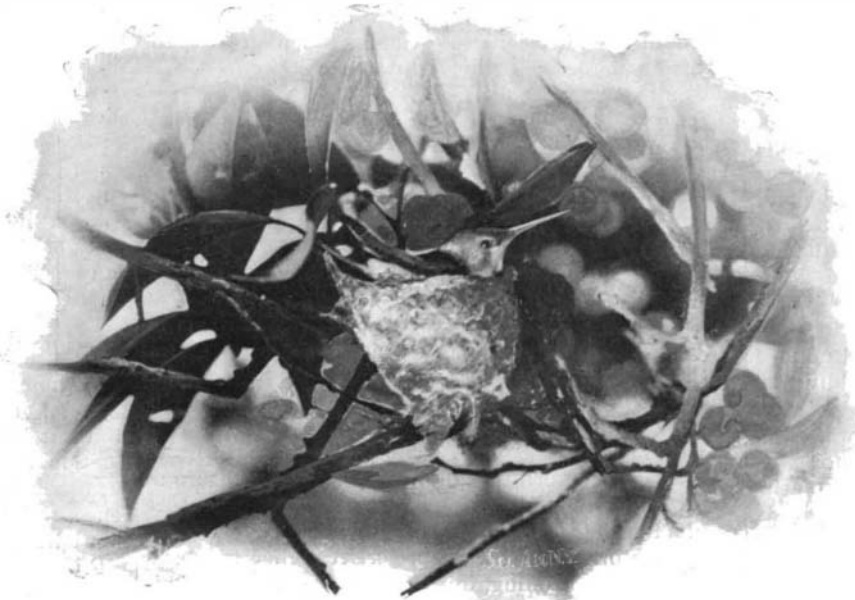
A few years ago we published an account of the successful raising of this plant at Clifton, N. J., by Mr. S. C. Nash. The Victoria Regia is indigenous to inland South America. It was discovered on the Amazon and taken to England, where it was exhibited at the Crystal Palace. It was named in honor of the Queen. This great lily has been known and exhibited in England for fifty years.

THE ancient Greek water supply system showed every modern improvement, such as we have acquired only within the last decade.—Monatschrift für Öffentlichen Baudienst.

#### TAME HUMMING BIRDS.

BY CHARLES FREDERICK HOLDER.

In Southern California almost every dooryard and garden has its quota of humming birds—among the most interesting of the feathered tribe. I recall hearing John Bell, the taxidermist and naturalist, who was a friend and companion of Audubon, say that he once heard a humming bird sing when lying perfectly quiet beneath a bush. He considered it a novel occurrence, but the humming birds of Southern California certainly utter many notes which may be construed into singing.



THE TAME HUMMING BIRDS OF CALIFORNIA.

My first experience with these little creatures was on the slopes of the Sierras between two deep and well-wooded cañons.

In a little garden belonging to one of the sons of John Brown, whose "soul is marching on," many humming birds congregated, flying from bush to bush the whole day long, glistening and gleaming in the sun like living gems.

One day, when strolling through this semitropic garden, I saw a little brown humming bird watching me gravely from the broken stalk of a wild sunflower. As I gradually drew nearer, it merely cocked its head upon one side and gazed at me in a mildly inquisitive manner until I was within two feet of it, when it flew away twenty or thirty feet. Again I approached quietly, and succeeded in obtaining a position within a foot of the little creature, who appeared fascinated and entirely devoid of fear. I now carefully reached out my hand around it. The little head slowly followed until its gaze was wholly directed from me. Then with the other hand I caught the dainty creature, hoping to keep it as a pet. It was released in a large room, with an abundance of sunlight and flowers, but it became at once so wild and was obviously so unhappy that I gave it its freedom.

My next attempt at cultivating a friendship with a

impossible creatures took their place; bits of animation which at the slightest movement opened their wide and cavernous mouths for the expectant food. The little birds, which first resembled hairy spiders more than anything else, soon obtained their feathers, and eyed us with gentle curiosity whenever we approached the nest. A rich sirup of sugar and water was now offered them, and found to be very much to their fancy. A drop upon the end of a broom splint would at once become the target for their slender tongues.

As it became evident that the birds would leave the nest in a few days, the delicate structure was severed from the branch and removed to the room of one of the ladies of the house, who now undertook their education. The little creatures almost immediately deserted the nest, taking position upon its edge, with much unsteady fluttering. Then began the first experiments in flying, a rapid vibration of the wings, which merely raised the birds a few inches above the nest. This was succeeded soon after by a short excursion into the air, following the drop of sugar, taking it upon the wing from the hand of their mistress just as they would when feeding from a flower. Two or three experimental days and the birds became perfectly tame. They would alight upon the finger or head of their mistress, come when called, and displayed the most artless and confiding dispositions.

When the nest was taken the mother bird made no protest, in fact, was not seen, but she soon found her offspring. The young birds, two days later, having learned the use of their wings, flew to the window that faced the orange grove and clung to the meshes of the screen with their tiny, delicate claws. Their plaintive squeaking soon attracted the attention of the mother bird, who hovered about the place for several days, endeavoring to reach her imprisoned young, reluctantly flying away whenever one of the household appeared.

It would be impossible to conceive greater confidence than that displayed by the little captives. They were absolutely without fear and courted the closest intimacy. At night they slept on the edge of a basket in a closet in our room, and every morning awakened us by hovering over our faces, uttering sharp little metallic notes; when successful, alighting upon the extended finger, cocking their tiny heads from side to side in an expressive demand for food. At breakfast they frequently flew downstairs, following their mistress, often perching on the sugar bowl or some convenient roost on the table, from which they would watch the proceedings apparently with the greatest interest. The little creatures, hovering in the air and feeding from our hands, presented a charming spectacle.

When called, the pet bird would fly from room to room, evidently understanding its name, and was a constant surprise to lady callers, unaware of its presence. A humming bird, in the family of a friend of mine, met its death by being taken for a gigantic bee. It flew to the gorgeously decorated hat of a visitor, humming about the artificial flowers and following them up as the guest attempted to escape. The latter, finally, struck it down with a fan, only then discovering, to her surprise and dismay, that the supposed insect was a pet humming bird.

Who first conceived the idea of taming so delicate a creature as the humming bird is not known, but it has frequently been done. Old habitués of Taylor's restaurant, on Broadway, will recall the tame hummers which at one time were exhibited in the window and which attracted the attention of hundreds of passers by. The birds were thoroughly tame, and knew the German who caught them perfectly. He fed them by using glass flowers, which were filled with sweetened water.

The question as to the food of humming birds is one that has aroused much discussion, some authorities stating that they live entirely upon the sweet exudations of flowers, others believing that insects form part of their food. I can state that the California ruby throat cannot, in my experience, live on sweetened water alone. It requires minute insects, and, perched upon the fingers of their mistress, our little pets would eagerly hunt for insects on the window pane. Ants they would not notice, but very small gnats and spiders were very much to their liking. I assume that their



VICTORIA REGIA IN BLOOM.

humming bird was with two young birds, a nest and eggs having been discovered on a low branch of an orange tree in my garden. The mother bird was very loath to desert the eggs when I approached and readily submitted to the photographing process, the plate showing the little creature sitting high on the nest, her beak pointed slightly upward. When any one went near the tree the bird did not make the slightest movement, evidently relying on the protective resemblance which she and the nest possessed to a remarkable degree.

Finally, the two eggs disappeared and two reddish