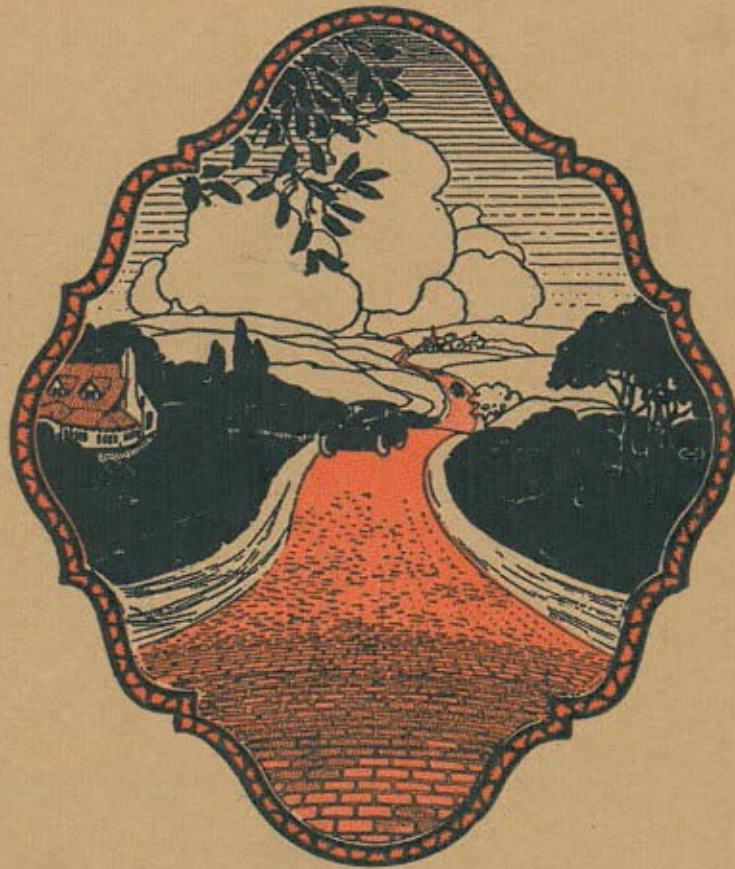


# METROPOLITAN

*Largest Maker of Paving Brick in the World*



C A N T O N , O H I O





METROPOLITAN

*Largest Maker of Paving Brick in the World*

CANTON, OHIO













# "Largest Manufacturers of Paving Brick in the World" — What That Means to You



THIS is a rather inspiring thing to be able to say: "We are the largest manufacturers of paving brick in the world." We often do say it. We like to realize that it is so.

But what does it mean? Is it just an empty phrase? Or is it the expression of a great responsibility and a great power to fulfill it?

We take it to mean something of great importance not only to every present buyer of Paving Brick but to whomsoever is interested directly or indirectly, as engineer, official, contractor, or as taxpayer or user, in good roads, good streets, good pavements.

In the first place, "largest in the world" must mean that there is an underlying reason why we are so. A business does not become the largest of its kind through luck.

It means that the men at the head of METROPOLITAN are organizers, men of imagination, creators, economizers. They built up several paving brick plants around some of the finest brick-shale deposits in the United States. They saw the possibilities inherent in co-ordinating these plants with others similarly situated.

They carried out the things they had planned and the result is the Metropolitan Paving Brick Company of today, with *seven* modern and highly equipped plants under one ownership and management, with the greatest total output of Paving Brick in the world.

Among these seven plants are some of the oldest and most successful in the business. Therefore "largest in the world" means a concentration of the longest experience and highest skill in the business.

It is a commonplace of modern business that a concentration of the longest experience and the highest skill and organizing ability and abundance of fine raw material means not only a very large output but at the same time a **PRODUCT OF THE HIGHEST EXCELLENCE** and **FACILITIES FOR THE BEST AND MOST LIBERAL SERVICE IN CONNECTION WITH THAT PRODUCT.**

Thus METROPOLITAN SERVICE as well as METROPOLITAN PAVING BRICK has acquired a reputation which we believe is unsurpassed in the whole paving field.

This reputation is of such enormous value to an organization of the dimensions of METROPOLITAN that we have an unlimited responsibility to ourselves to





“Valley” from which Shale has been removed. Shale beds at left.

preserve it untarnished. Responsibility to ourselves is here the same thing as responsibility to *you*, for it is only by continuing to give *you* the best of brick with the best of service that we can fulfill that responsibility to ourselves.

Thus “Metropolitan—the Largest Manufacturer of Paving Brick in the World” is seen to be a phrase and a fact which means something of definite practical value to everyone concerned in any way with pavements.

### **Why a Road or Street Should be of Brick**

The process of manufacturing Metropolitan Paving Brick is an interesting and confidence-inspiring thing and we are going to describe it in a way which, we believe, will interest alike the lay and technical reader. But first it is quite as important to show why the demand for Paving Brick exists, grows and will continue to grow until, as we think, the Brick Pavement shall be the undisputed standard for all roads and streets from which much is demanded.

What is a road, anyhow? From the user's standpoint it is just one thing, a *surface*—a hard, smooth and permanent surface which yet does not get slippery.





Steam Shovel at work on Shale bank.

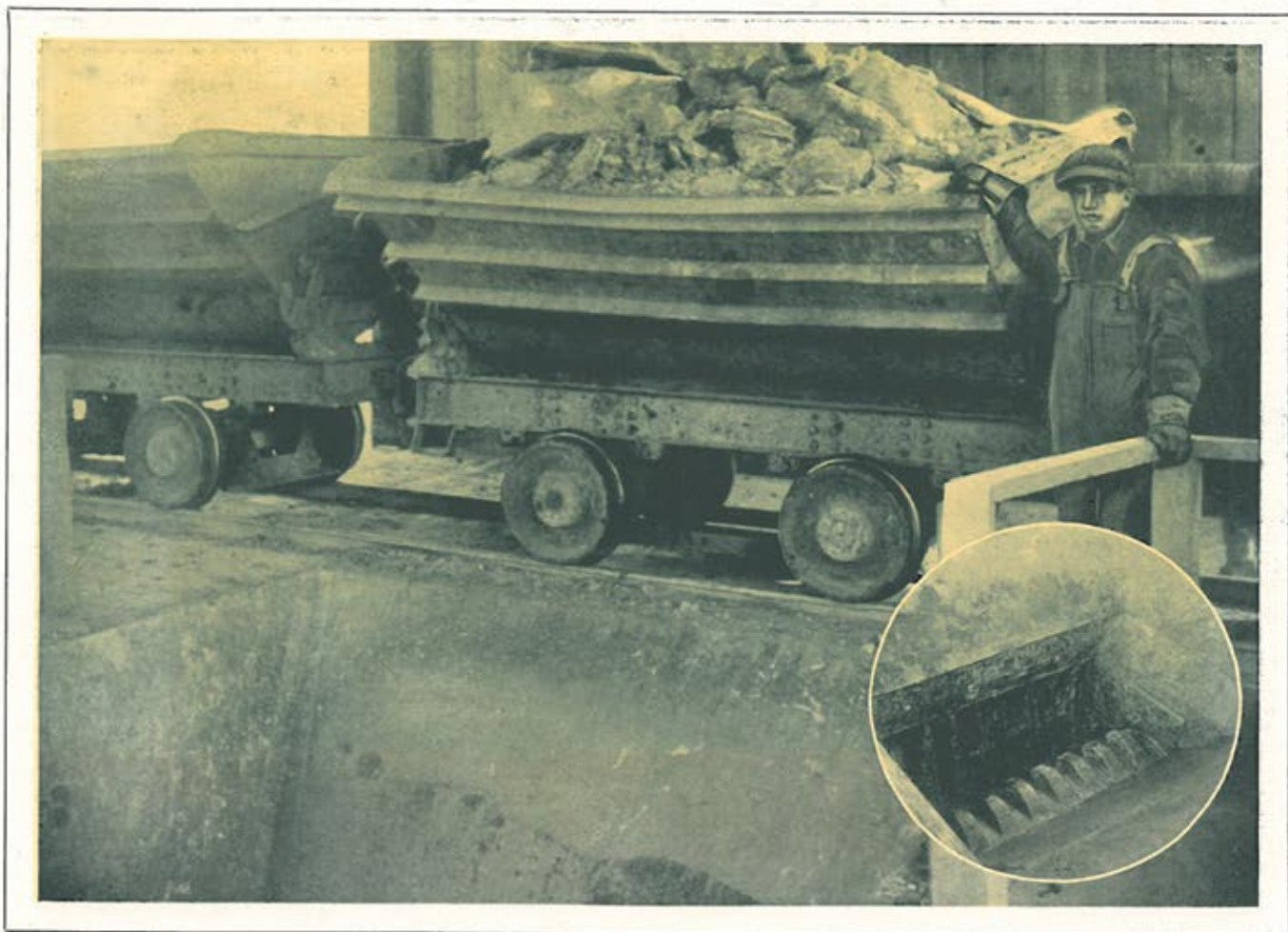
It has length and breadth but no thickness so far as the users' interest is concerned. The whole road problem begins with and centers upon *surface*.

Unfortunately it does not end there. For the engineer and road-builder the problem of making the "hard, smooth but not slippery surface" remain such runs into so great a variety of complications that the problem of the *surface* itself which really *is* the road is often given less consideration than its transcendent importance deserves.

There are three ways in which a paved road or street may fail—three only. First, the surface may wear or decay away, leaving the foundation. Second, the surface and foundation may *both* wear or decay away leaving a veritable nightmare for all traffic. Third, the foundation may, from one of several causes, be too weak to support the surface in place, with results but little better.

So from the engineering standpoint, and equally from that of the taxpayer a road is the surface above described, made of something which has a very high resistance to wear and supported by a foundation which has a very high resistance to settlement, cracking or other form of dissolution.





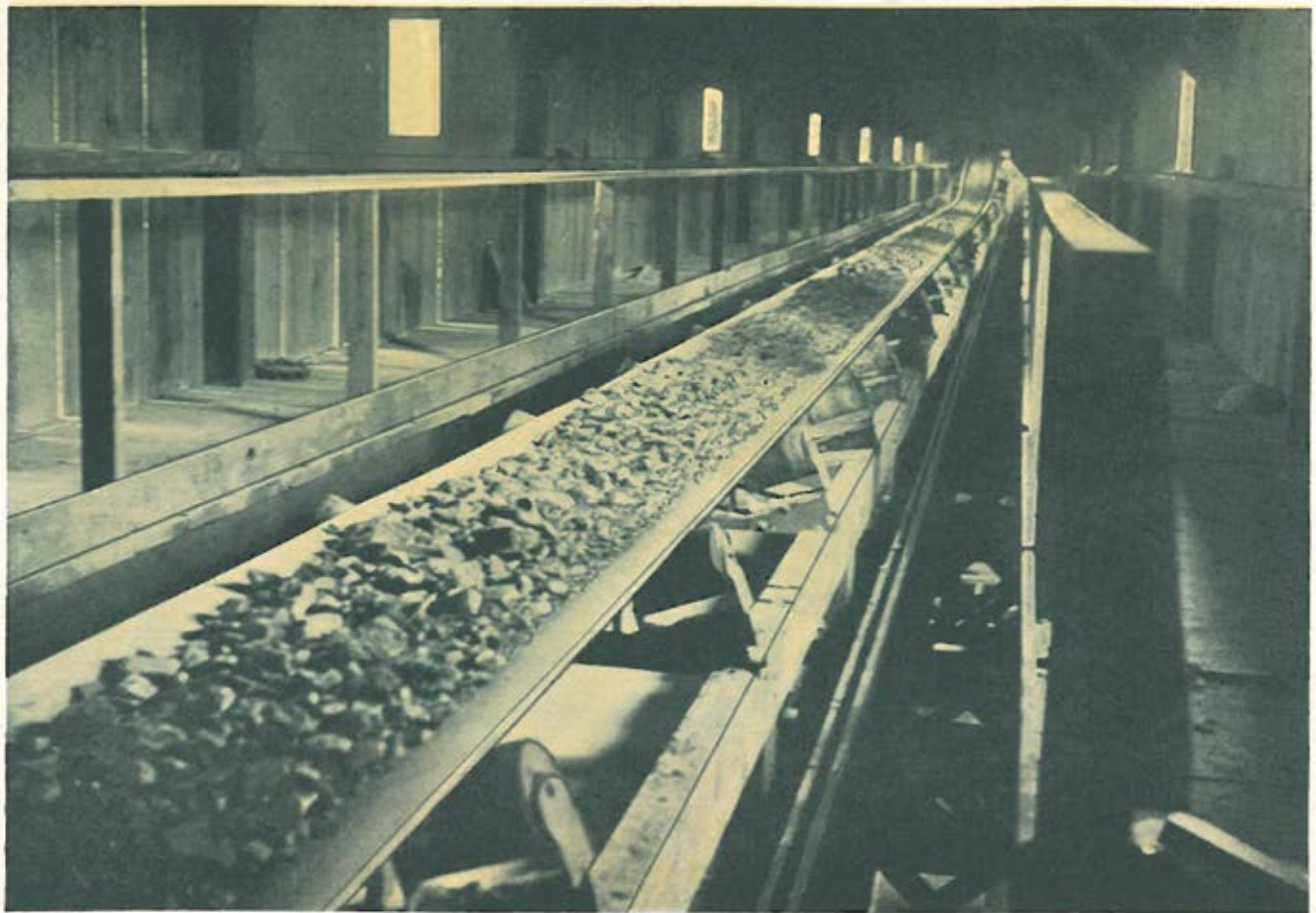
Car about to discharge into Crusher. Small picture shows "business" part of Crusher.

There is no "100% pavement". Conditions of soil, drainage, climate are so various that human ingenuity has not yet circumvented them all with perfect success. Owing to the difficulty of making a permanently solid foundation it is sometimes contended that if that can be made secure the surface may be the subject of compromise and if it wears out or turns wavy or full of holes it may be patched or renewed.

This is true but it is *begging the principal question*—that of the *surface* on which the wheels actually roll—and introducing another question which interests every human—the question of expense.

A road, however good the foundation, which has a surface needing frequent repairs or renewals is a poor road and an expensive road. Repairs cost money. Renewals are not made until the surface gets very bad, and before it gets very bad it is pretty bad. In this condition it provides neither cheap and convenient hauling nor comfortable riding, which is what roads are for. It costs a lot of taxpayers' money to try to avoid renewal of the surface by patching, and in the repairs to vehicles which rough going makes necessary. When the renewal soon comes the road is closed, the "detour" costs time, power, repairs to vehicles, and the renewal





Belt Conveyor carrying Shale from Crusher.

costs much money. The foundation also is usually damaged when the protection of the surface is worn away.

No—a real road must have a foundation which will support the surface *and a surface worth supporting*—both.

Now about Paving Brick. We may make the dogmatic statement that Paving Brick (or block, as they are sometimes called) make the most durable road surface which is also smooth, in use today. We know of no one who is likely to deny a fact so well demonstrated. Indeed nobody knows the limit of life of brick as good as those we make under the *Metropolitan* and *Bessemer* brands.

There are brick roads in Europe over a century old. There are *many* brick roads and streets in the United States which have lasted under heavy traffic for over a quarter-century and appear to be good for as much more. Where the foundation is right the life of a Brick pavement under any but the hardest big city traffic may be measured in scores of years, at least.

And brick pavements have all the other important advantages as well as many lesser ones. Brick pavements are smooth yet they do not get slippery.



(Brick is often called the "non-skid pavement.") They are easy to clean in cities and in the country keep themselves practically clean. Their color is not dazzling in bright sunshine, but is very agreeable to the eye and fits well into any landscape. It shows up well under lamps at night. Brick pavements are not noisy.

Maintenance charges and repairs are of the lightest and a well-built brick road need never be closed during its life. No other pavement can claim as much.

It would be idle to maintain that Paving Brick solves the foundation problem, though it certainly helps, through the permanent protection it gives to what is under it.

But it seems perfectly fair to say concerning any pavement which has at all heavy traffic to withstand, such as city streets and main country thoroughfares, that the problem as regards the surface is solved, and by far best and most economically solved, by Paving Brick. More and more engineers are coming to regard the problem not as "what foundation and what surface?" but "what foundation shall I use to support the *brick* surface?"

Whether looked at from the angle of service or cost the result is the same, for in most cases, because of its extremely *long* and *uninterrupted* service-life, the *cost per year of service* of a well-laid brick road or street is the lowest on record.

Brick gives both Quantity and Quality of Service.

### **"Metropolitan" and "Bessemer" Brands of Vitrified Paving Brick**

Paving brick are made and sold by METROPOLITAN under two brands.

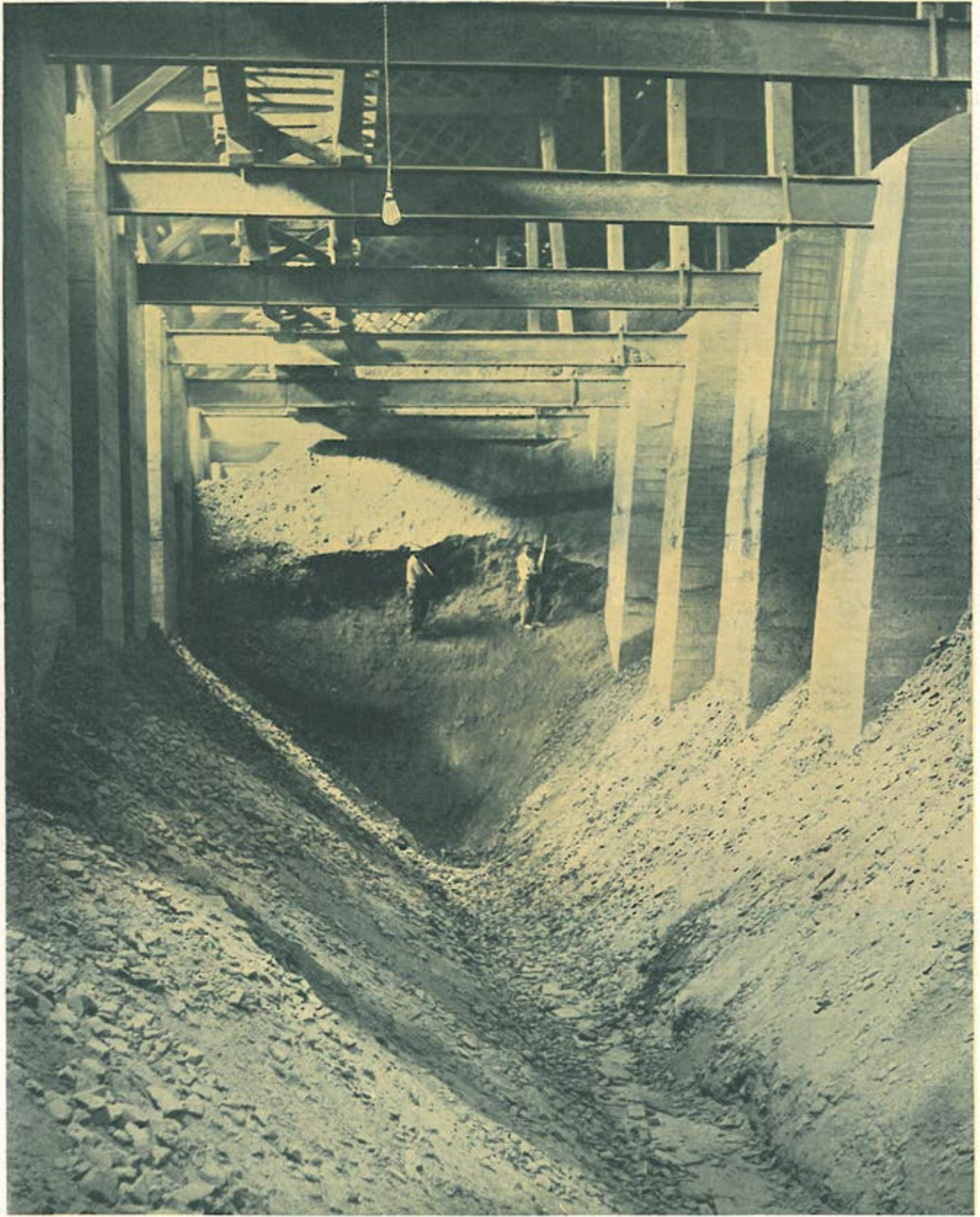
The names are "*Bessemer*" and "*Metropolitan*," both of high national reputation and each standing for the same fine quality and service. The materials and manufacture of both are practically identical.

The Company also makes high-grade structural hollow tile.

### **How "Metropolitan" and "Bessemer" Vitrified Paving Brick are Made**

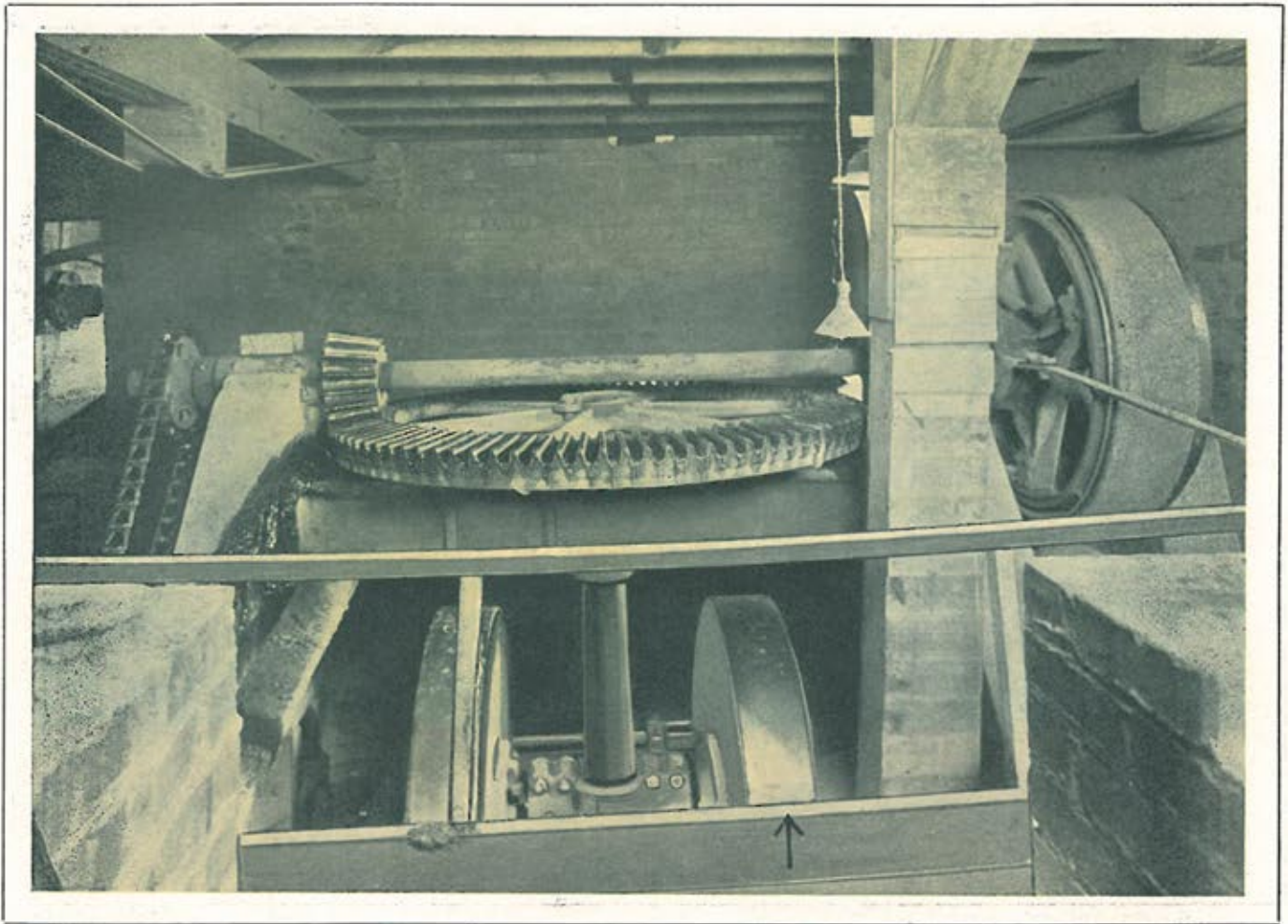
Vitrified Paving Brick are a special product made of special material in special sizes, all these things being strictly adapted to the special purpose of resisting the wear and shock of traffic for many years. Experience has shown that paving brick should be considerably larger than building brick. They are now usually about ten pounds each in weight and are often called Paving Block.





Corner of a shale Storage room.





A Dry Pan. Arrow points to one of the Crushing Wheels.

The material of which the best paving brick or block are made is a certain sort of clayey shale rock. METROPOLITAN has an enormous reserve supply of this shale of superlative quality.

Vitrification of the brick made from this shale consists in heating until the particles are partly melted together. Through this partial melting, if carried on under exactly correct conditions at exactly correct temperatures, the brick become a nearly homogeneous whole, absolutely impervious to water, and extremely hard and tough, but not brittle.

To meet the exact requirements for best and toughest brick requires not only technical equipment but a high order of skill and experience.

It is the exactly correct degree of vitrification of exactly correct materials that makes "*Metropolitan*" and "*Bessemer*" Paving Brick the hard, tough, impervious and wear-resisting paving material that they are. Too much vitrification makes brick brittle, too little makes them soft. Our long experience, perfect materials and modern heat-control apparatus make "*Metropolitan*" and "*Bessemer*"





Pug Mill mixing Shale and water.

brick just exactly right—maximum hardness, maximum toughness, and so, the maximum wear-resistance also.

But let us follow the impressive process of manufacture from shale bed to road bed.

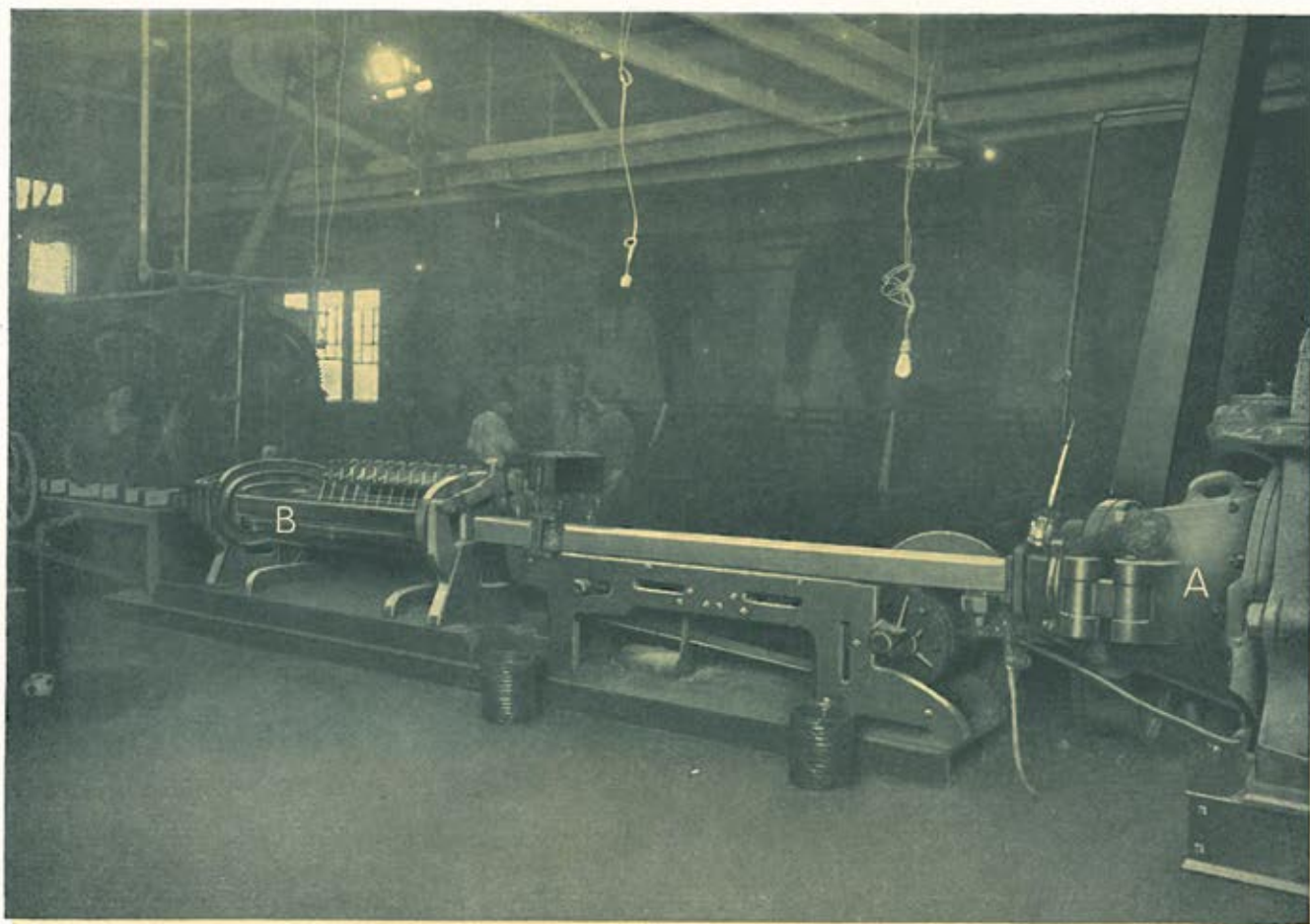
### Excavating

We first approach a vast area where many years of digging have created a considerable valley as deep as the thickness of the shale deposit, perhaps fifty feet, with nearly vertical sides upon which is an interesting sectional view of the shale strata.

At the foot of this high bank is seen a Steam Shovel at work opposite a line of small dump cars with their locomotive on a movable track.

Probably no machine gives a more perfect illusion of being intelligently alive than a steam shovel. The great toothed scoop, which holds a dump carload,





Brick Machine at A, Cutter at B. The "bar" of Shale is shown moving between.

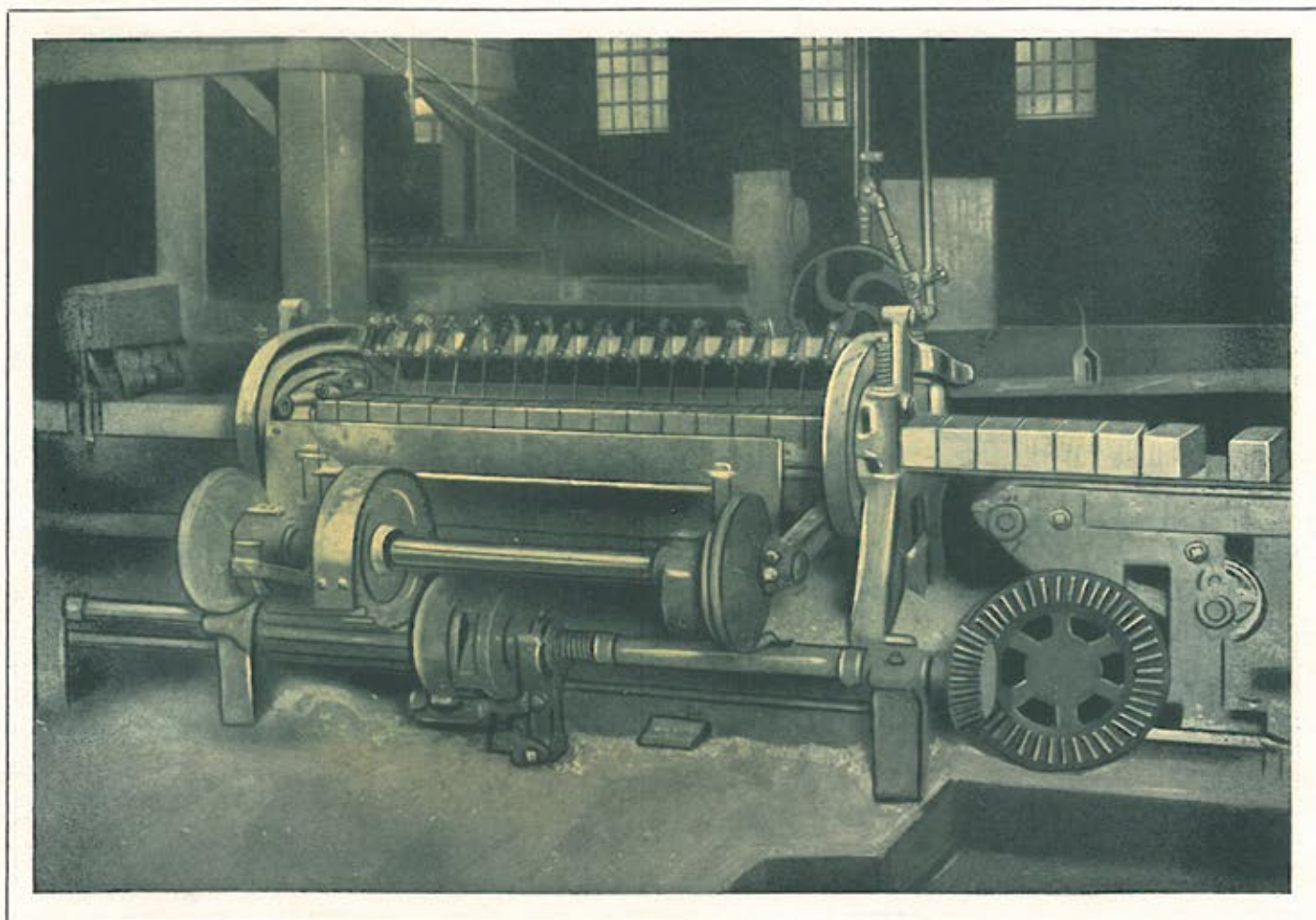
moves forward, up, sidewise, down, back, around, with elephantine but accurate gestures. Its steel toothed bucket bites from the bank a great mouthful of rock and clay, swings it swiftly around and deposits it precisely and as gently as a ton or two can be deposited in a waiting car. The car is full. The whole train "moves up one." "*Plump*" comes another shovelful. The car is full. In a short time the whole train is full and goes puffing off, to be promptly replaced by a train of "empties."

From the shale bank the loaded train proceeds to the shale room of the brick plant proper, entering it on one of the high trestles within it and adding its load to the already huge piles of brick material—enough to make eight or nine million ten-pound brick.

### Crushing

From the piles in some plants, or direct from the cars before going into the piles in other plants, the shale goes through powerful rotary crushers. These crushers, with apparent ease, smash the lumps to a reasonable degree of fineness and deliver





Cutting and Separating.

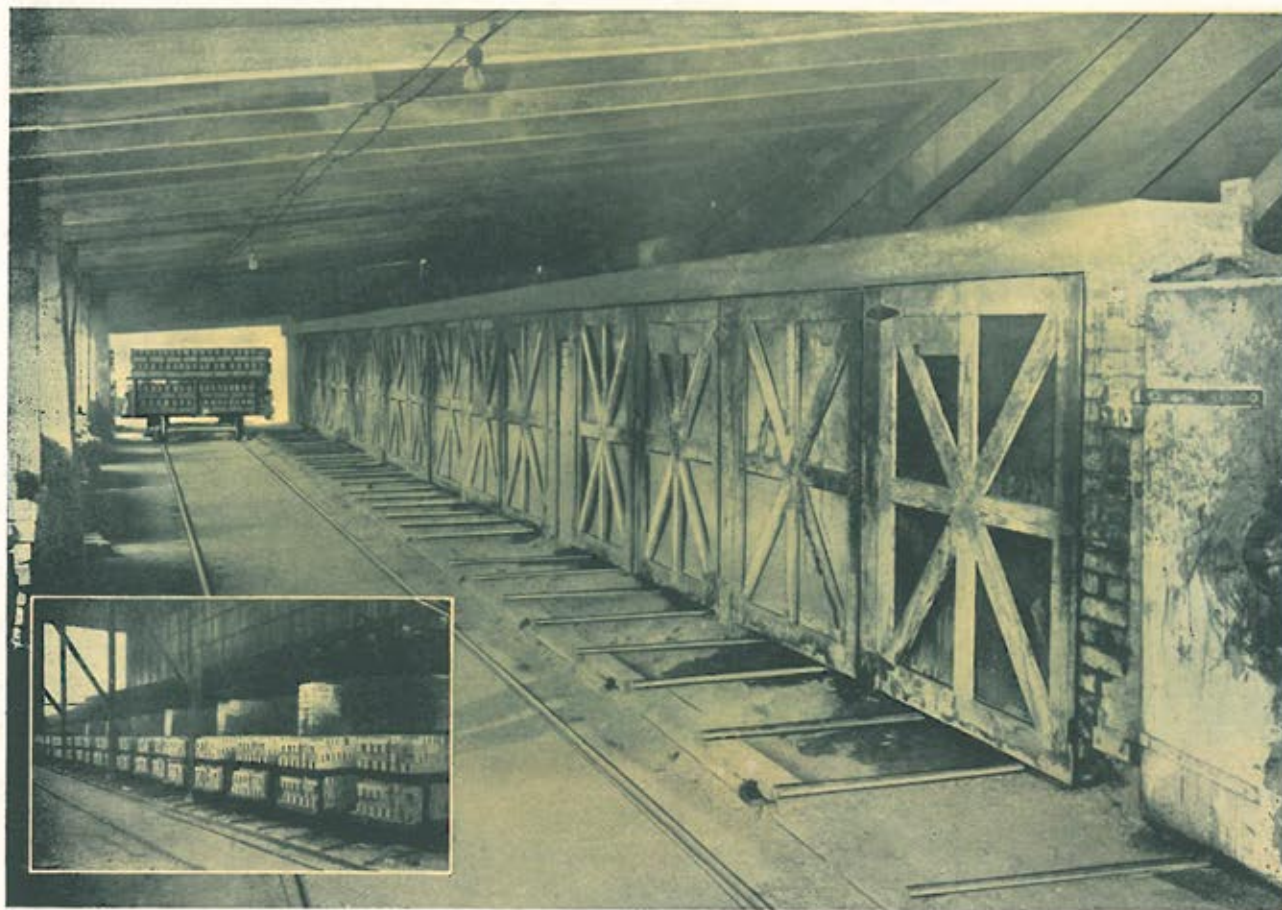
the resultant stream of crushed material upon a concave belt. This belt forms a moving trough in which crushed shale rides to the storage rooms or to the "Dry Pans," according to the sequence of operations in the particular plant.

Each of the dry pans is really a monstrous crusher. The bed of each is a great steel disk or table which rotates thirty times per minute. On the surface of the great disk roll two enormous iron wheels, freely suspended so that they may bear down with their full weight of over three tons each on the table which turns them.

The shale from the belt conveyor is received on the disks and passes again and again under the terrible wheels which of course reduce most of it to the fineness of powder.

The centrifugal force of the rotating table gradually sends the fine shale outward toward its edge. Near the edge the table is perforated and the fine shale drops through into a bin or trough from which it is automatically loaded upon a conveyor composed of a series of steel buckets which travel on an endless chain.





Charging end of Drying Tunnels. Small picture shows brick emerging at cooling end.

## Screening

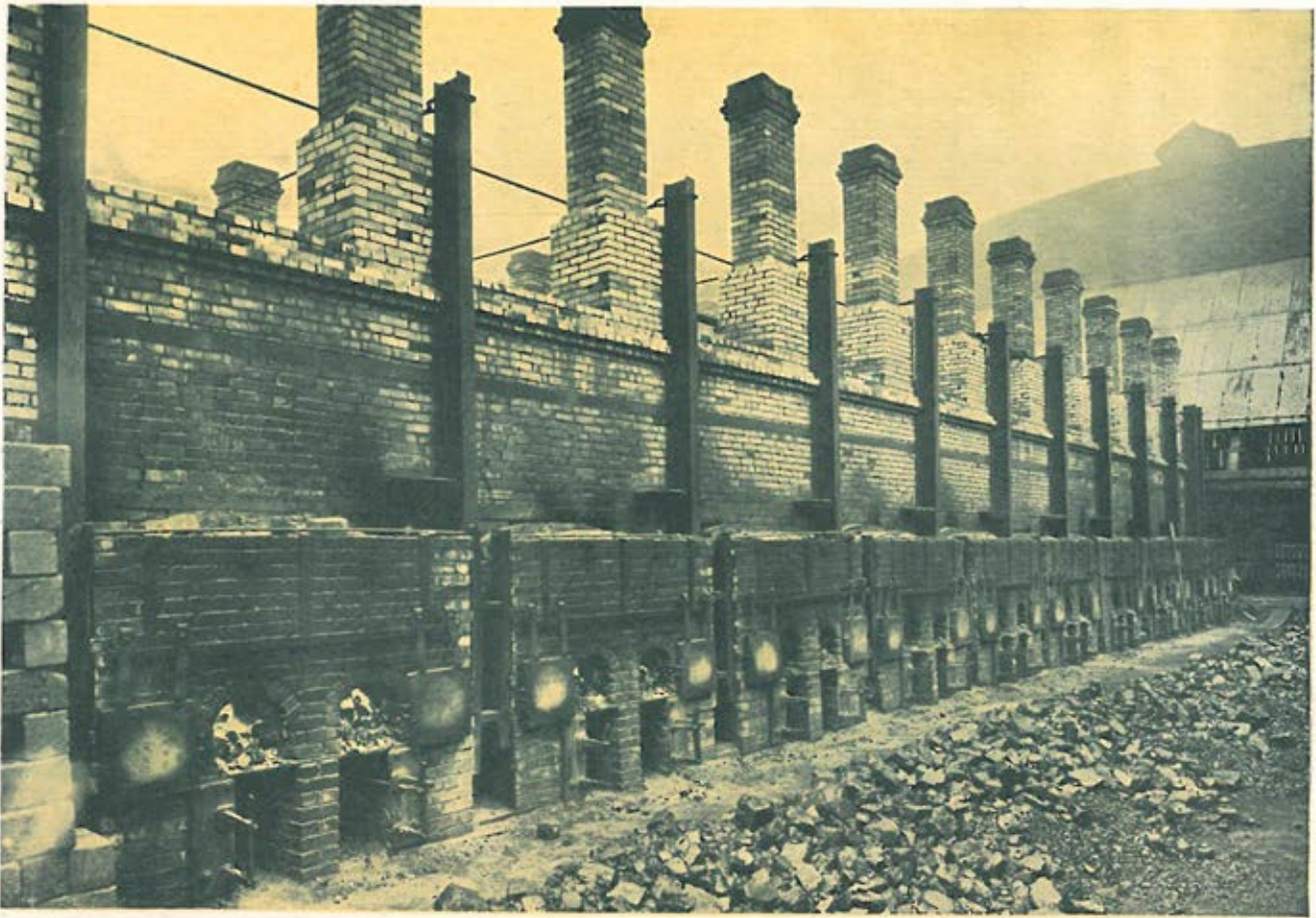
It will be seen as we go along that the shale never stops moving for an instant. From the time it leaves the shale room until it is formed into bricks it is kept continuously and automatically on the go. Men perform almost none but supervisory work. It is modern organization for economy in production carried close to its limit.

From the dry pans the ground shale travels by the conveyor to the top of the building.

It is necessary to *know* that all of the shale is ground to the exact fineness necessary for producing "*Metropolitan*" and "*Bessemer*" brick. This is ingeniously accomplished by making it necessary for any shale which is too coarse to go back to the dry pan for regrinding.

At the top of the building the ground shale passes from the conveyor into a wooden chute which leads—where?—straight back to the dry pans.





Exterior of Kiln.

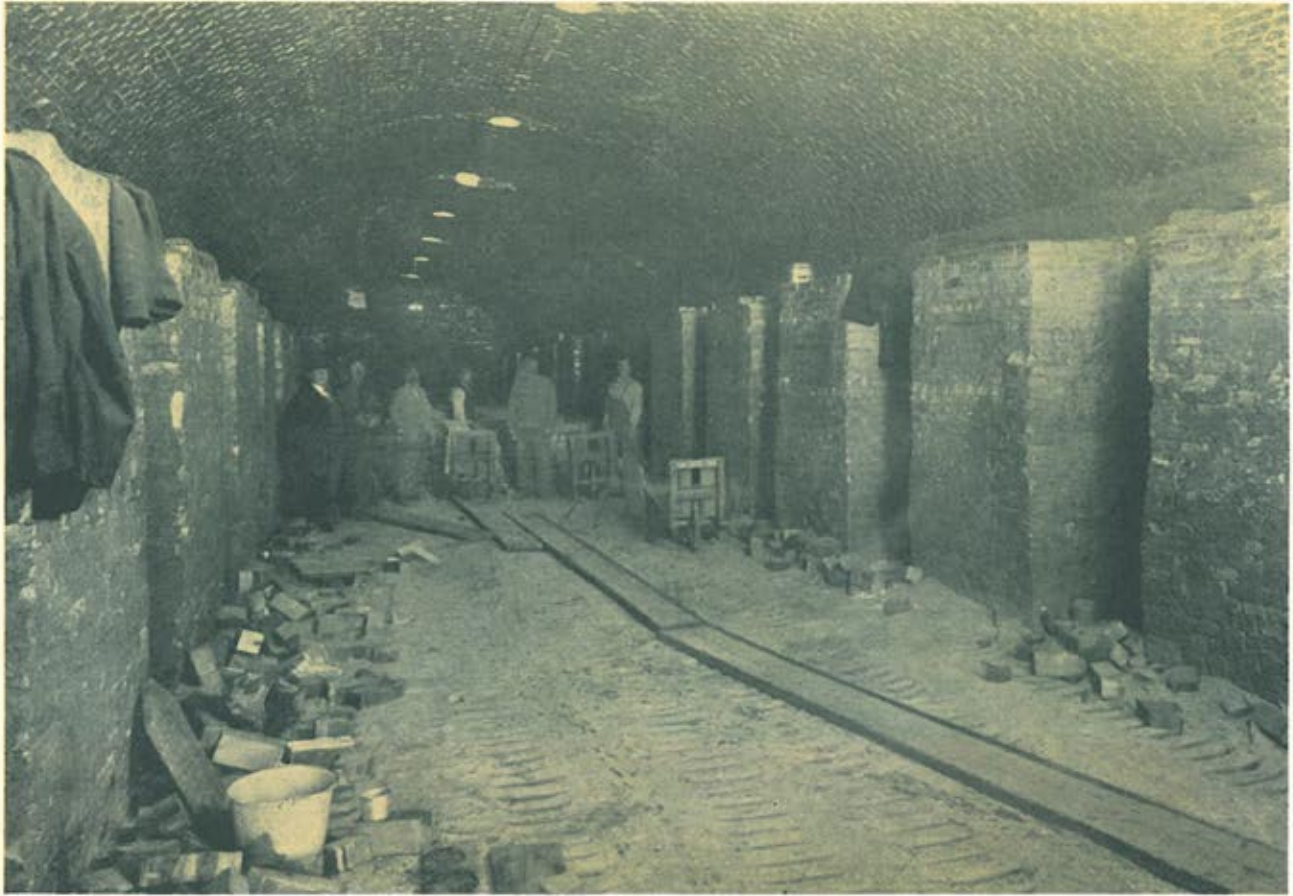
But part way down the steep incline is an opening some six feet long in the bottom of the chute. Across this opening is a Screen of piano wires placed so close together that only the shale of proper fineness can get through. And through it goes, only to be received upon a moving belt conveyor which carries it on its way towards finished brick.

The coarser particles must pass over the screen and go back to the terrible wheels of the dry pan. A crumb of shale may have the luck to make the circuit more than once, but if it made it fifty times it could not get into a "*Metropolitan*" or "*Bessemer*" brick until small enough to pass through the impartial meshes of the piano wire screen.

### Mixing

The fine shale which, as described, goes through the screen is taken by belt conveyor to the mixer or Pug Mill. The pug mill is a long trough in which, throughout its length, is a series of revolving paddles like propeller blades. The fine shale enters at one end of the trough, is mixed with the correct pro-





Interior of Kiln.

portion of water and at the same time pushed forward by the paddles until it emerges at the other end of the mixer of just the right consistency for brick making.

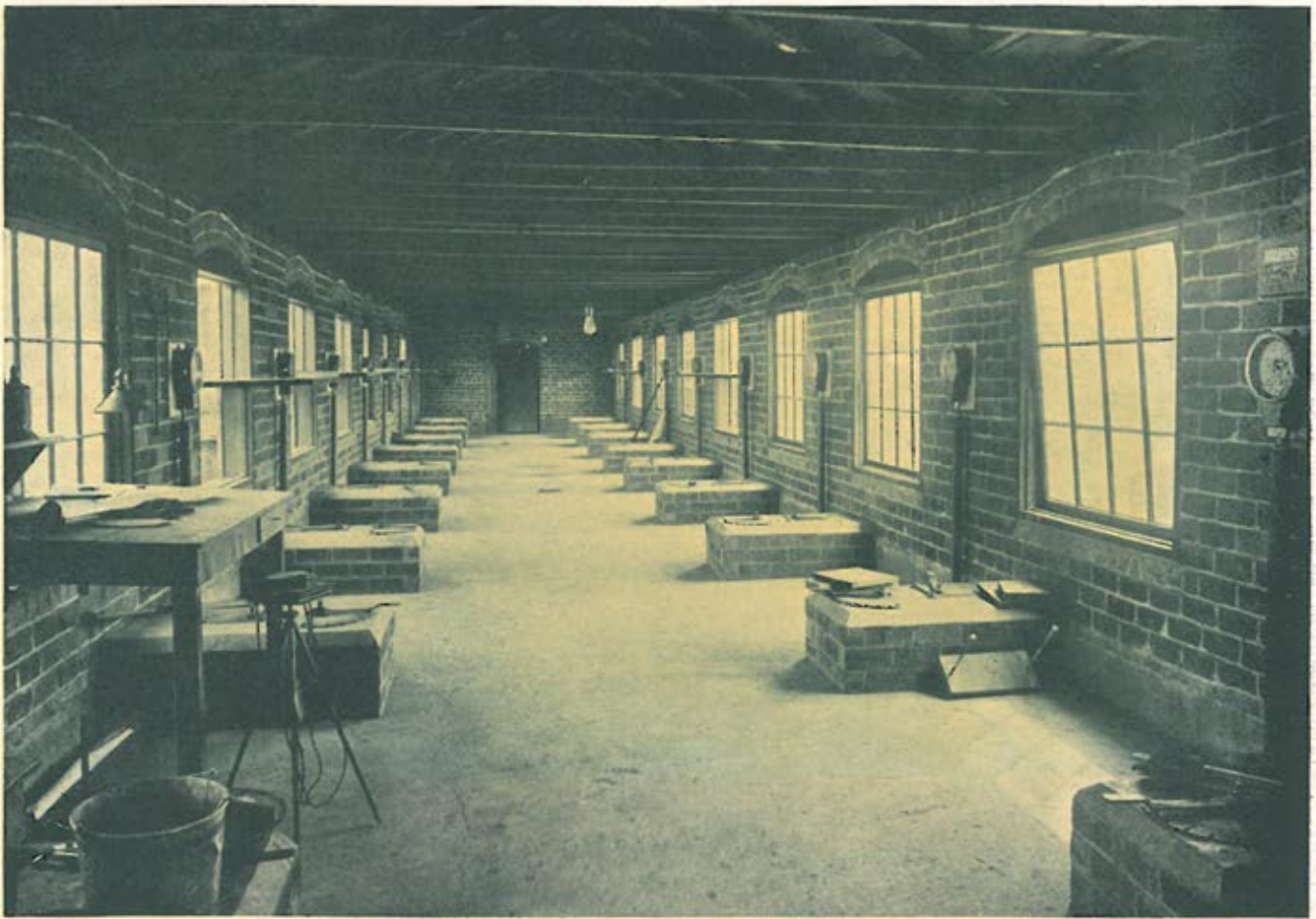
### **The Brick Machine**

On coming from the pug mill the shale is in the form of a smooth, stiff dough, which goes into a receptacle on top of the Brick Machine.

The brick machine is the same in principle as a kitchen meat grinder. The wet shale is forced forward by a huge screw or auger and is ejected continuously at the front of the machine through a rectangular spout the size of the side of a brick. There appears to come from the spout or die, as it is called, an endless rectangular bar of wet shale, stiff enough to support itself in a span of two or three feet.

This bar is received on a moving belt and when cut across at proper intervals it becomes raw brick.





Temperature Control Room.

## Cutting

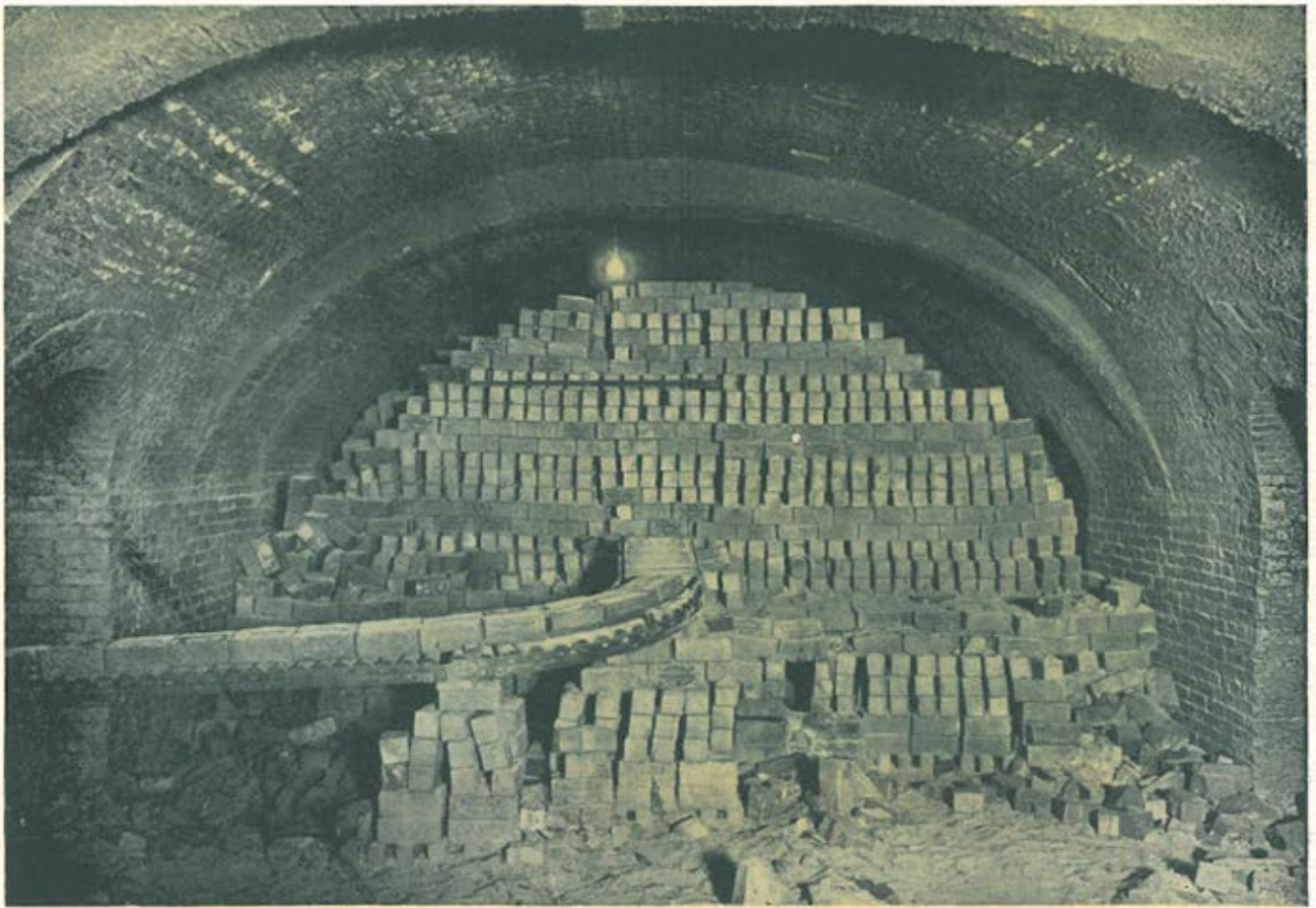
To accomplish this cutting the bar of shale on the belt moves across a Cutting Table. Down comes a frame across which are strung fifteen tight steel wires as far apart as the width of a brick. These wires cut off fourteen bricks at each stroke and make strokes enough to cut about 10,000 brick each hour. So as not to interrupt the continuous flow from the brick machine, the Cutting Frame travels forward at the same rate as the bar of shale, coming back to its starting point before each cut.

## Separating

The next process requires each brick to be picked up by hand. As the brick come from the cutter they lie too close together to permit this. The means by which this apparently difficult separation is accomplished is laughably simple yet perfection in action.

As the belt on which the brick are traveling comes to the end of its journey, the brick are received by another belt which travels somewhat faster. As each





Discharging the Kiln.

brick lands on the faster belt it naturally proceeds a few inches before its neighbor lands behind it. Thus the bricks which a moment before lay side by side now lie a few inches apart, just right for convenience, without having been handled or disturbed in their course.

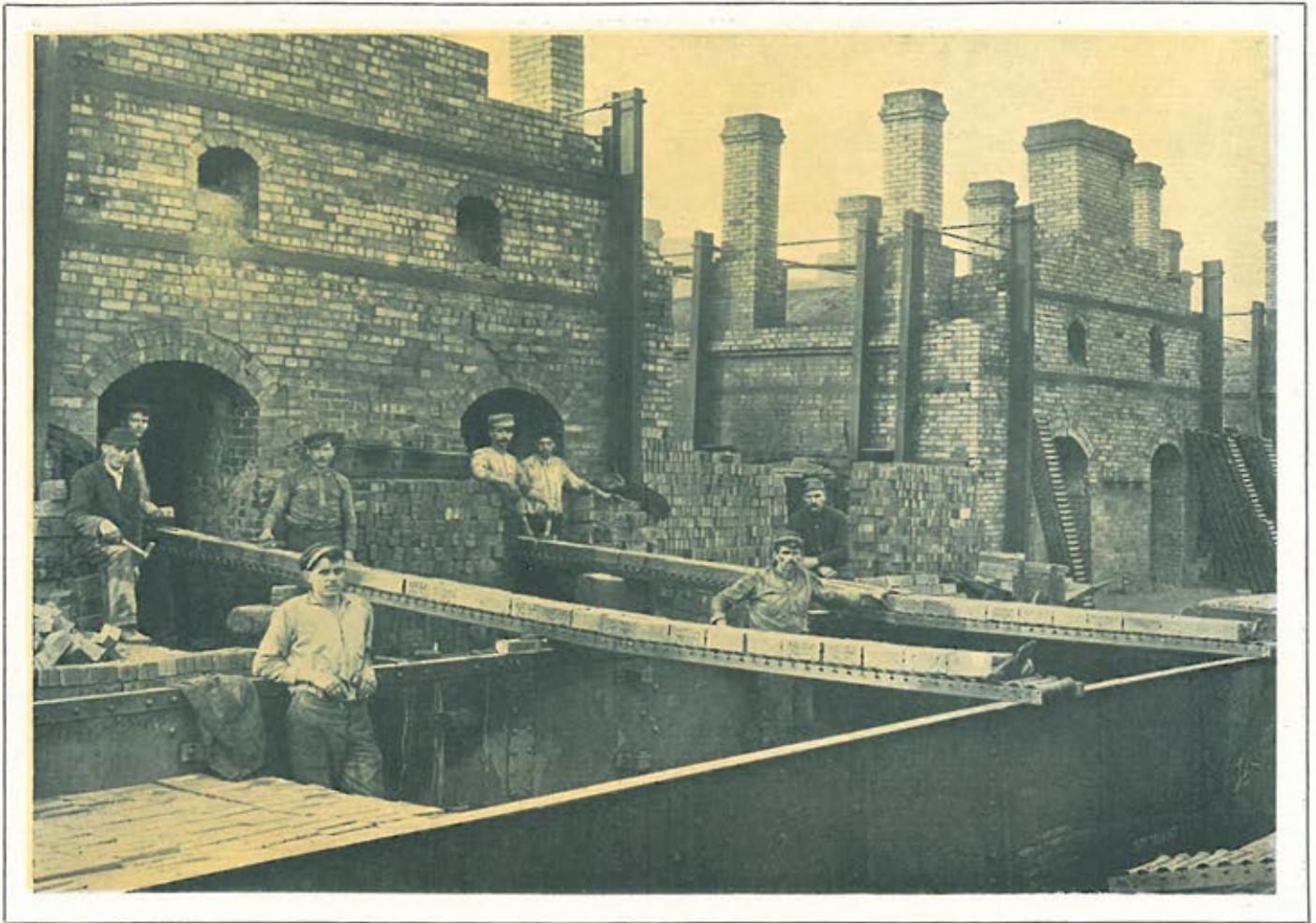
### Drying

The brick, thus separated, are stacked by hand on special cars in such a way as to allow free circulation of air among them.

These cars are drawn by a small electric tractor to the Dryer, a series of long, tightly closed tunnels to which dry air at high temperature is blown from the kilns where other brick are being burned. The heat thus used for drying the brick would otherwise be wasted.

The cars of brick are moved gradually from the cooler to the hotter end of the dryer whence they are discharged after about forty-eight hours, practically dry and strong enough to withstand handling and to support considerable loads.





Loading from Kiln to cars. Note inspectors with hammers.

## Burning

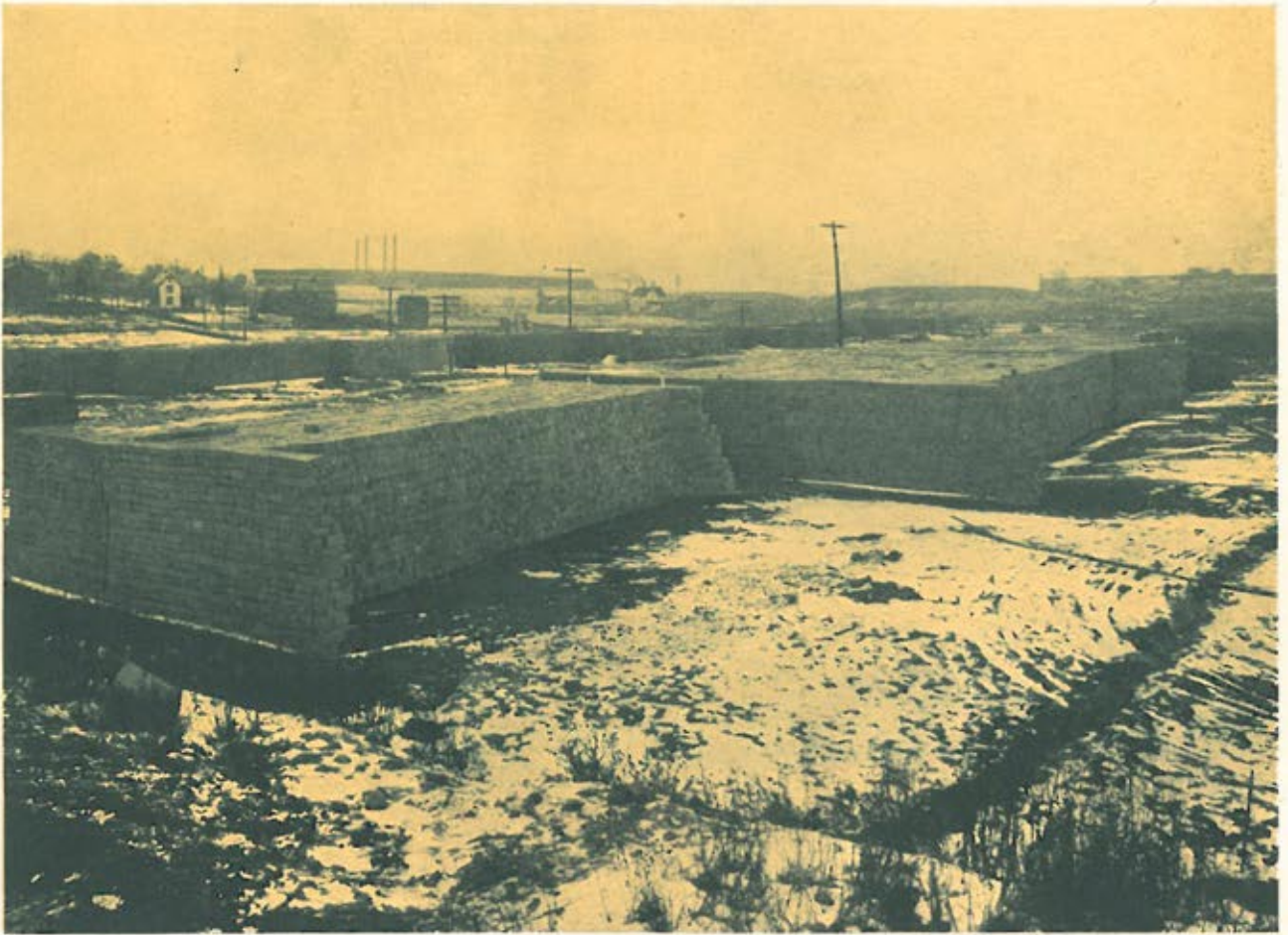
Burning the brick ought to be the most spectacular part of the entire process of brickmaking. Unfortunately the spectacle of 100,000 brick glowing white hot for days is unavoidably concealed within the kiln. Only an impressive hint can be got from what may be seen through a "peep hole."

The usual Paving Brick Kiln is a small brick building, with brick-arch roof and lined with fire brick. Along the outside walls are twenty-four or more brick furnaces each with its own fuel door and smoke stack. Coal is burned in these furnaces.

The building is practically filled with raw brick leaving only room for good circulation of heat. Sand is sprinkled on the brick as the kiln is filled to prevent the brick from adhering to each other.

When a kiln is charged it is sealed, the fires are started and kept burning for seven and a half days. About the fifth day the temperature reaches the neigh-





One of the great Storage Yards.

borhood of 2,000 degrees Fahrenheit where it is held for the balance of the period.

The kiln is then allowed slowly to cool and is discharged.

### Inspection

*Each brick is individually inspected as it comes from the kiln. The first-class brick are either loaded directly into cars for shipment or piled in the immense storage yards.*

*Every brick which is misshapen and every brick which is imperfectly burned is culled out and sold separately for other purposes than paving.*

*As a further check against the possibility of soft or brittle brick going out under our brands, brick from various parts of each kiln are subjected to the Standard Rattler*





Brick which have passed through the Rattler Test. Note their uniformity.  
The Rattler Shed is behind the pile.

*Test which gives practical proof of the complete fitness of the brick for highest grade pavements.*

We have described merely the *process* of making “Metropolitan” and “Bessemer” brick. Of course in our *seven plants* there is a vast multiplication of this process and a total output which is enormous.

We use not only the kiln described, but also the “continuous kiln,” a long U-shaped tunnel-like kiln in parts of which loading, burning, cooling and unloading are continuously in progress.

Thus it will be seen that METROPOLITAN not only can serve with every advantage of its great organization, but that its special pride is to keep abreast of or a little in advance of the times.

No one will make a mistake in putting his paving problem up to METROPOLITAN in the fullest confidence of getting the best that is to be had.









**Metropolitan Paving Brick Company**  
**Canton, Ohio**

---

MEMBER NATIONAL PAVING BRICK  
MANUFACTURERS ASSOCIATION



