An Engine and an Epidemic

Courtesy of Dr. Robert T. Rhode, 4745 Glenway Avenue, Cincinnati, Ohio 45238-4537

When George W. Dick of Ross Ohio, bought a steam engine, he never could have predicted the bizarre function it would fulfill.

In 1872, Dick crossed the ocean to England, examined the products of the famed Aveling & Porter firm in Rochester, purchased a six-horsepower steamer, and, through agent W. Churchill Oastler of New York, arranged to ship it to America. Dick could afford such a luxurious technological innovation as an engine. A prosperous businessman, Dick ran three thriving enterprises: flour milling, sawmilling, and threshing (Giddings 2-3). In addition, Dick owned thirty acres in section 34 and forty acres in section 15 of Butler County. Listing Venice, Ohio, as his address, he resided in Ross with his wife Mary Elizabeth Whipple (Brown 1)

Dick selected an Aveling & Porter engine for two reasons. First, by a special act of the 1870 United States Congress, an individual could purchase a British engine more conveniently. According to agriculture historian F. Hal Higgins," . . . the pressure on Congress became so strong to allow the British steam 'ploughs,' rollers and 'road steamers' to come in duty free that the import duty was lifted from Jan., 1871 to June, 1874." Higgins estimated that the buyer realized a savings of twenty percent, which might total to a thousand dollars on the purchase of an engine (1). Dick's other reason for acquiring an Aveling & Porter derived from the firm's reputation as a leader in the field of traction engineering.

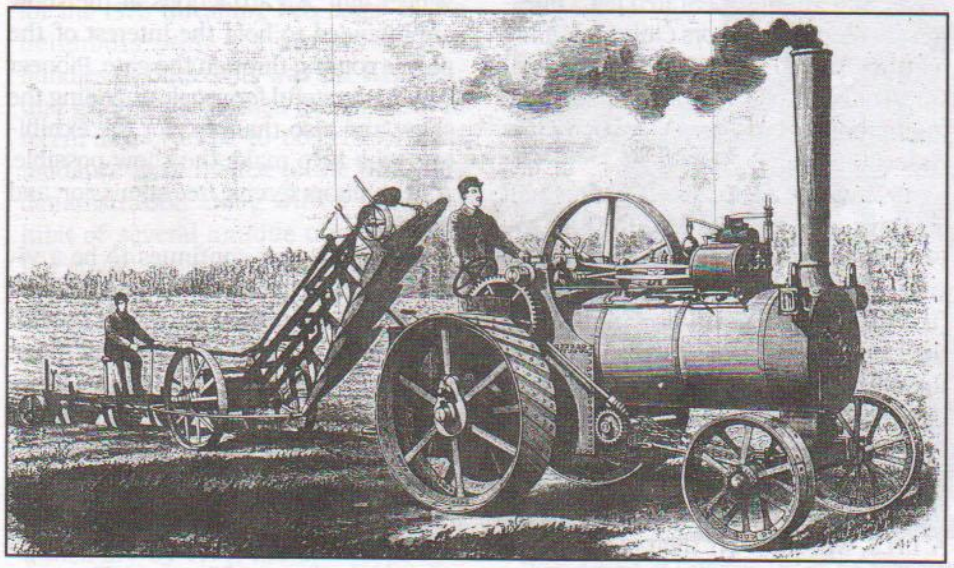
Derek A. Rayner, Hon. Assistant Editor of the National Traction Engine Trust's periodical *Steaming* and News Editor of the steam-enthusiast magazine *Old Glory*, calls Thomas Aveling the "Father of the Traction Engine" (Rayner 1). Author of the book *Road Rollers* (Shire 1992) and past chairman of the Road Roller Association, Rayner writes authoritatively on Aveling & Porter, Limited. Rayner reports that Aveling, born in 1824, "lived in an agricultural community and became a farmer during which time he became aware of the possibility of applying some of his self taught mechanical engineering knowledge to farming operations." In the 1850's, Aveling "established a small engineering works in Rochester, Kent" and built agricultural machinery. Rayner describes Aveling as "inventive" but lacking "systematic engineering training." All the same, "by 1856 he introduced a plough which so impressed the local farming community that he was awarded a prize ...."

Aveling considered a portable engine being pulled by a team of horses "an insult to mechanical engineering." Rayner continues the story:

> "He thus patented his first major invention which was the creation of a self moving engine, made for him at Lincoln by the firm of Clayton & Shuttleworth & Co. by the addition of a driving chain to the previously horse drawn portable engine. There were further developments of this type of machine and in 1862, Aveling entered into a partnership with Richard Porter to form the firm of Aveling & Porter."

Rayner credits Aveling with the invention of a steam roller as early as 1865. Recognizing that the boilers of these early engines were "subjected to considerable stresses," Aveling, in 1871, "invented and patented the hornplates, the upward extensions of the firebox sides to carry the bearing housings and driving shafts" and, by 1875, "evolved a design of steam roller and traction engine which became standard for virtually all British manufacturers up to the end of production of steam powered road engines ...." While a few sporadic attempts to build traction steamers in the United States had been made in years prior to 1870, Congress in that year acknowledged the need to import British engines, which, thanks to Aveling & Porter, incorporated advanced technology.

Dick's engine gleamed aboard the barge which brought it to the old basin dock beside the Miami & Erie Canal in Hamilton, Ohio (Giddings 2). Dick proudly supervised the unloading of the splendid new machine. Excitement rippled through the crowd assembled along the broad pavement by the canal



Aveling & Porter's Road Locomotive adapted to direct traction steam plowing. Cut from page 15 of the Scientific American of July 12, 1873.

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when the smoking engine, under its own power, rolled its driver wheels to begin the sixteen-mile journey to Millville. In his *Development of the Traction Engine in America* (1916-17), C. M. Giddings, the inventor who revolutionized the design of Russell engines, described the traction system of Dick's Aveling & Porter:

> "This engine had a single cylinder that was cast as a part of the steam dome of the boiler. Power was transmitted from the crank shaft to the rear wheels, through a system of spur gearing to a live axle that was on the outside of the fire box, and the differential gear was mounted on this axle and received the power through a large master wheel which carried the compensating pinions which transmitted the power to the axle through a large bevel gear that was keyed fast to the axle. With one loose driving wheel they carried the other bevel wheel that engaged with the compensating pinions. The drive wheel on the other side of the axle was keyed fast, a type of power transmission identical in principle with the present day steam traction engine practice." (2-3)

The spectacle of Dick's Aveling & Porter engine driving itself along the highway inspired awe in the good citizens of southwestern Ohio who turned out to witness the triumph of industry. "' All who see it,'" Dick later boasted "'are amazed at the power we possess, and say that it seems to be a thing of life'" ("Steam Plowing" 15). Not everyone felt so sanguine about the British engine, however.

In his unpublished *Reminiscential,* or memoir, Clark Lane of the Owen, Lane & Dyer Machine Company of Hamilton, Ohio, wrote, " . . . Mr. George Dick . . . for 3,500 gold bought and imported a ten horse power [sic] English made road or traction engine. This engine was unnecessarily cumbersome and heavy and to American eyes of awkward appearance, and more or less of complicated construction and impractical for the American want" (9). Lane's vested interests in manufacturing agricultural steam engines may have influenced him to denigrate the Aveling & Porter product. Lane may have felt jealous of the British engine's tractive capacity. After all Dick purchased his road engine approximately a year before Owens, Lane & Dyer began experimenting with a chain drive and two years before the Hamilton firm brought out a gear-driven traction engine (Rhode 23).

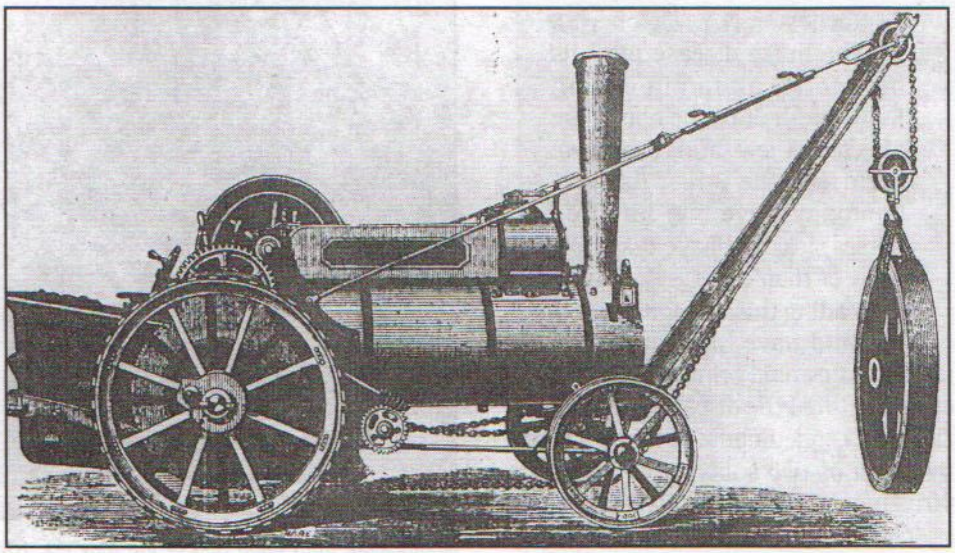
The *Scientific American* magazine for July 12, 1873, quotes from a letter Dick sent from Ross, Ohio: "'We have used our engine for almost all possible purposes—on the gravel road, for drawing logs out of the woods, for thrashing grain, and are now hauling pork in the streets of Cincinnati, over a boulder pavement'" ("Steam Plowing" 15). The same issue states that "the Aveling & Porter road and farm locomotive . . . gained the first prize given by the Royal Agricultural Society of England, in 1871." The article portrays the model of engine Dick purchased:

> "The engines have single cylinders, placed on the forward part of the boiler and surrounded by a steam jacket in direct communication with it.... They have tender and tank for an ample supply of fuel and water, and a steerage eminently simple and perfect in action. The compensating motion to the driving wheels of Aveling & Porter's engines is of malleableized iron, the use of which, although more costly than ordinary cast iron, greatly increases the strength of the working gear. One man only is required for the entire management of the engine. The boiler is horizontal and multitubular, and is a more economical consumer than upright boilers. It is made of "best best" Staffordshire plates, and the fire box is invariably of Lowmoor iron. It is lagged and felted, and proved to a pressure of 200 lbs. to the square inch. The daily expense of working a six horse power Aveling & Porter engine is approximately $6...
>
> "To this time Messrs. Aveling & Porter have built more than 900 road locomotives, many being successfully in use in the United States..."

Dick's "road and farm locomotive" served him well, according to his own report: "'On the macadamized road we draw from Hamilton to Venice, including wagons, 25,000 lbs. of coal in one load—a distance of eleven miles."

Dick listed the following achievements of his new engine:

> "For logs in the wood, it is unequaled; we detach the engine from the wagon, and roll the tree on to the wagon, an inch at a time if we choose, and hold it there—a feat that horse power will not perform.
>
> "We have thrashed nearly



Cut from page 335 of the Scientific American of May 30, 1874.

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> 40,000 bushels of grain with it since harvest, and have found no place that we were unable to reach, no matter what the grade or how deep the mud. Its facility for taking itself and thrasher away makes it a great favorite with the farmers, who have been bored with hitching their horses to a heavy steam engine, and spoiling them with the over load. Our greatest gain is in time, moving from place to place. In five minutes after the last sheaf is through, we are on the road; and we once moved 600 feet and were thrashing again in ten minutes from the time the last sheaf was through at the last place (by a watch held on us by a friend)."

Professor Robert H. Thurston—a name well-known among steam buffs — put such a six-horsepower Aveling & Porter engine to a severe test. He caused the engine to pull a train of ten wagons hauling a load of 63,400 pounds up a long grade of one in nineteen at a speed of two and a half miles an hour, and the wheels showed "no signs of slipping" ("Steam Plowing" 15).

Events conspired to put to use the adhesive friction of the tires on Dick's Aveling & Porter. On October 22, 1872, *The Cincinnati Enquirer* ran a mere six-line news item updating the spread of what was called the Canadian horse disease:

> Rochester, N.Y., October 21. — The horse disease prevails here to an alarming extent. Fully one-half of the horses are affected. A few fatal cases have occurred. The Street Railway Company have one hundred horses sick, and have taken off some of their cars."

Few reading this ominous announcement would have imagined what the next month would bring. Years later, science identified the disease as equine influenza, a "pneumonia of horses caused by either of two subtypes of influenza virus type A" (*International* 1437).

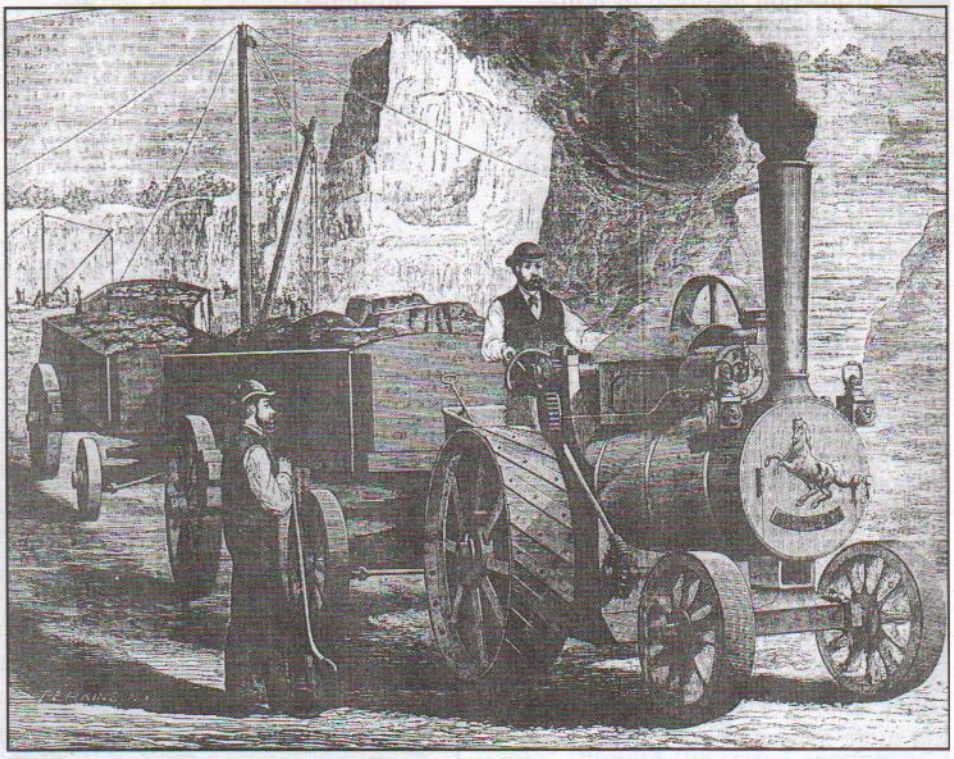
The dispatches of the next day sketched a terrifying increase in the number of infected horses in Rochester: "There are but few horses in the city that are not affected." Cincinnati readers discovered that the street railways livery stables, and express companies of Rochester had suspended operations. Worse, the Canadian horse disease had appeared in Buffalo, New York City, and Boston. In only twenty-four hours, three-hundred cases in Buffalo and Rochester had proved fatal.

The symptoms of the flu included "a flow of tears from the eyes, watery discharges from the nose and general languor, followed by a cough" (Oct. 23). A subsequent fever racked the suffering creatures. On October 24, *The Cincinnati Enquirer* reported that seven-thousand horses in New York City now had the disease, "causing the greatest panic." The paper stated, "The contagious qualities of the disease are very violent ...." In Rochester, the scarcity of horses had brought losses to all branches of business. The Secretary of the Treasury declared the United States closed to diseased horses from Canada. With foreboding, readers of the *Enquirer* learned that cases of the flu had been reported in Syracuse, in Jersey City, in Hoboken, in Springfield, Massachusetts, and in Chicago.

In desperation, veterinarians resorted to blood-letting and drenching. These harsh treatments killed horses already debilitated. Remedies included "a solution of tar and belladonna" (Oct. 24). Dr. Smith of the New York City Health Board recommended sprinkling stables frequently with carbolic acid and gum camphor dissolved in alcohol (Oct. 25). Meanwhile, the *Enquirer* printed a horrifying rumor: "Alarming stories have been circulated to the effect that the infectious nature of the disease is transmitted to human beings, but beyond these reports no cases have as yet appeared wherein the master has taken the disease from the horse."

An eerie quiet descended on New York City's streets. Almost no vehicles were running. The estimated number of horses infected in New York City alone stood at eighteen thousand. Health experts kept predicting that most horses would recover, but companies which relied on horses for a living drove sick creatures into untimely death. In cities ravaged by the horse influenza, those truckers who continued to work their horses charged "fabulous prices" (Oct. 26).

On October 28, the *Enquirer* headlined the news that, in New York City, no carriages were available for funerals. The



Another cut from page 335 of the May 30, 1874, Scientific American . Note — George W. Dick's road engine probably resembled this Aveling & Porter.

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paper carried this dispatch: "The Steinways having received a telegram from Boston, ordering forty pianos in a hurry, telegraphed back that they would gladly fill the order if Boston would send a consignment of horses. This is not a joke." Merchants began to resort to oxen, which lumbered about clumsily in the narrow confines of city thoroughfares. A veterinarian advised treating sick horses with a hypodermic injection of "a powerful stimulant subcutaneously." With trepidation, readers noted that cases of the flu had appeared in Cleveland and Columbus on October 29.

By October 30, the *Enquirer* reported that retail grocers in New York City were marking up their prices because they were "unable to replenish their stocks ...." Smaller factories were closing because they could not have coal delivered. Goods were rotting on piers. A dispatch said, "The streets present a spectacle of wretched-looking, tottering horses, dragging terribly overladen cars and vehicles." Daily, the deaths of a hundred infected horses occurred, mostly from overwork. The Cruelty to Animals Society attempted to prevent the working of sick horses, but Broadway stage companies sued the Society, each claiming $25,000 damages for interference with their business (Oct. 31). Ocean-going steamships carried only one-third the typical load of freight. Lacking horses to pull its equipment, the fire department brought in a self-propelling engine (Nov. 1) Performing feats of physical endurance, laboring men drew wagons and streetcars by hand.

Amid the mounting panic, a physician in Jersey City commented that, about thirty years before, a similar epidemic had broken out "and was followed by a like epidemic among the human species" (Nov. 5). Aides to the President found the distemper among the horses in the White House stables. The "epizootic" or "epizooty," as the disease came to be termed, closed the iron mills in Pittsburgh. A dispatch from Louisville naively stated, "Reports of the horse disease here are untrue. No authenticated case has yet occurred in the city, and no fears are entertained among horsemen that the disease will reach here" (Nov. 8).

For approximately a month, readers of the *Enquirer* had followed the relentless advance of the epidemic. Then, on November 12, citizens of the Queen City confronted this headline: "Half the Horses of Cincinnati Attacked by Slight Colds." The epizooty had arrived. Now Cincinnati would encounter the same predicaments other cities had faced and would resort to similarly desperate measures. The newspaper stated:

> "...the extremest solicitude exists in the public mind in regard to the matter, and it is only necessary to glance at the state of things which would be brought about by a sudden and general prostration of the horses used in this city—the motive power by which all local transportation is carried on, and which, if taken away, if for even the shortest time, could not fail to inflict the direct results on every branch of trade. In this matter the humblest citizen who depends on the daily market for his supply of food is no less interested than the merchant whose contracts must be fulfilled. The threatened stoppage of the street cars gives discouraging prospects for the immediate future to that large class who do business down town and whose houses are at the extremes of the different car routes."

The reporter went on to show "the rapid march of the malady" from stable to stable across the city.

On November 14, the *Enquirer* announced that two horses had died "over the Rhine," as the German neighborhood north of the canal was called. Streetcar transportation had come to a standstill. The city brought in steam dummy engines to run on the more popular streetcar lines but feared repeating the experience of other cities, which had found that the dummies frequently jumped the tracks. The newspaper said, "The clatter of hoofs on the pavement grows fainter every day..." Someone proposed "to bring cows into the city and milk them before the doors of the consumers." The paper called attention to a vexing problem: "One of the attendant evils on the

Significant Details Discovered by Derek Rayner

Historian and author Derek A. Rayner of York, England, visited the Lincolnshire Archives Office to trace the origins of the engine purchased by George W. Dick in 1872. Rayner carefully examined the Aveling & Porter Royalty Book No. 1 and the firm's Despatch Book. He found that punctuation "was not a strong point" and that the "words are all strung together and in very tiny handwriting which makes reading the details and interpretation of them difficult." Italicized material in brackets (below) represents explanations which Rayner has added for readers' benefit.

Information from the Aveling & Porter Royalty Book No. 1 and the firm's Despatch Book, courtesy of Lincolnshire Archives

Aveling & Porter No. 814 6hp traction
Improved Brackets No. 103
W. C. Oastler, New York for G. W. Dicks, Venice
(Despatch Date) March 7, 1872
Fitted with 5'-0" x 10" W. I. *(Wrought Iron)* driving wheels
Front wheels 3'-6" x 6"
Cylinder 7-3/4" bore x 10" stroke
Flywheel 4'-6"X 5" Improved
Wrought Iron Brackets *(hornplates)*
With compensating gear *(differential)*
Driving axle 6'-2" x 4-3/8"
crankshaft 2-7/8"
W.I. crankshaft pinion
With 6 hp comd *(combined)* governors
Gunmetal axle boxes
Gunmetal inter bearings driving side, cast iron on flywheel side
W.I. funnel with C.I. base
W.I. top turntable
Waste steam pipe 1- 1/2" dia returning to heat water in tender
Throttle valve in exhaust pipe
W.I. through pin
No brake
W.I. steps on tender
Double shackle on drawbar
W.I. wheel guard
Steerage from tender with worm & wheel
Double steam dome
Motion covered in

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horse disease is the appearance of a whole horde of quacks and patent medicine venders ...."

On November 15, the *Enquirer* presented a verbal picture of conditions in the city:

> "Although man-power is to be had, it is at such a fearful advance in rates that the men moving off the goods would swallow up more than their worth. Wagons hauled by men were to be seen everywhere, and barrows loaded with goods were being tugged along the downtown streets, pushed by men sweating and swearing. The streets about the Public Landing showed a dreary exhibit of the state of affairs. Sidewalks piled full of goods waiting to be moved—cotton, crockery, produce, crates of poultry, iron, all piled up in heaps.

The sight of horse corpses bobbing in the Ohio River stirred harsh accusations against Pittsburgh for dumping carcasses upstream.

The paper advised that farmers shoe their oxen before transporting them to the stricken city: "Those big-eyed, bulky beasts make a strange appearance as they waddle clumsily along the streets." Their unshod hooves slipped on the pavement. Oxen posed unlooked-for dangers by ignoring commands, charging onto sidewalks) and crashing into storefronts.

A police order charged officers "to arrest all persons found driving horses afflicted with epizooty .... It is a sorry fact that there are men who would make a horse pull a heavy load as long as he is able to stand on his feet; and when they show signs of giving way they will lay on the whip without the least compunction" (Nov. 16). The horse disease hampered medical doctors by compelling them to make their rounds on foot. By November 18, increasing numbers of horses were dying. In fact, the death rate appeared to be "unusually large." Citizens began to complain about "the delay made by the authorities in removing dead horses," several of which remained where they fell for up to three days.

On November 19, the *Enquirer* ran this story:

> "A kind of panic exists among horse-owners. The dead horses carried through the streets suggests to every one possibilities in regard to his own stock. ... Horses are dying in ev-

FURTHER INFORMATION

Rayner states that there are numerous other Aveling & Porter products shown in the Despatch Book as being sent to W. C. Oastler dating from 1869 right through to 1880 and beyond. These included road locomotives, road rollers, and agricultural engines. Only on some of the entries was the eventual purchaser recorded. Included in this latter category were:

503 6hp road roller
Jul. 26, 1869
Comms *(Commissioners)*
of Brooklyn Park

533 8hp ?
Jul. 30, 1870
Wm. Gibson, W. Mace & E. Smith, Wilmington

620 6hp road roller
Feb. 20, 1871
New Haven City

683 6hp road roller
15 ton
Sep. 5, 1872
Washington

688 8hp road roller
20 ton
Jun. 12, 1871
Hartford City

710 6hp road roller
15 ton
Sep. 21, 1871
Newark

824 6hp road roller
Apr. 19, 1872
Bridgeport

836 6hp road roller
Apr. 30, 1872
City of Richmond

840 10hp road loco
May 28, 1872
Marshall Coal Transportation Company

937 6hp road roller
15 ton
May 30, 1873
Wilmington Co Co.

946 6hp road roller
15 ton
Jul. 3, 1873
St. Louis

1026 6hp road roller
15 ton
Aug. 17, 1874
Dept. of Streets & Highways
Newport USA

1077 5hp road roller
8 ton
Apr. 29, 1875
Mr. Hastings, Pittsburgh

1423 6hp road roller
15 ton
Apr. 4, 1878
Highways Dept., Charleston

1433 6hp road roller
15 ton
Apr. 24, 1878
Fall River

1583 6 hp road roller
15 ton
Apr 24, 1880
Chicago Corporation

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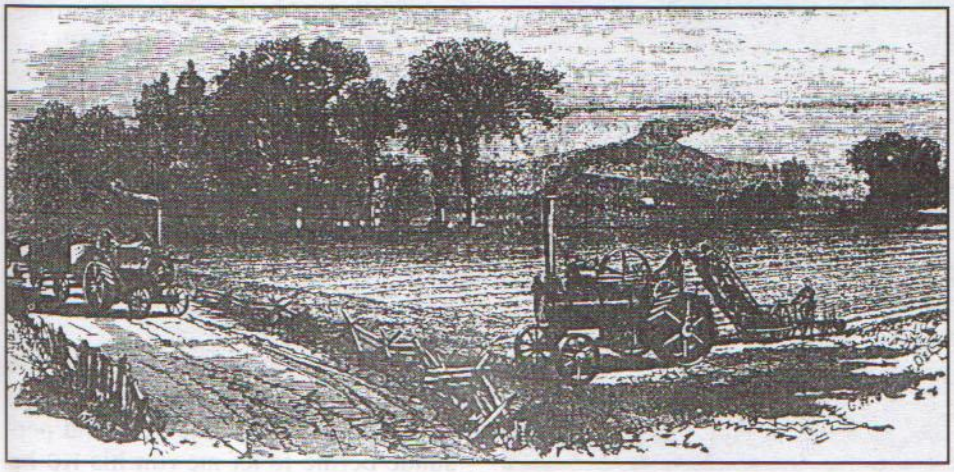
ery direction .... On Saturday last death began to pass about among the stables, and every hour since victims are falling down under the breath of the destroyer. ... These were not the deaths of worn-out hacks; among them were large, vigorous animals, some of which had never been sick. ... Putrid carcasses are accumulating in the back alleys and hollows, and now and then they are stumbled against in the street. The living animal shuns them with an aversion similar to that of a human for a corpse, hurrying out of the reach of the pestilential stench. Horses that have been dead for days from the ordinary causes never become so foul to the nostrils as are the few hours dead horses of the present plague. Horse owners are alarmed, and their fears are not groundless. The disease has shown itself here in a more dangerous form than anywhere else, and nowhere has death so rapidly followed on the heals of the epizooty as in Cincinnati."

The newspaper began to list a daily count of dead horses and their locations around the city. During the peak of the epidemic, approximately thirty horses per day perished from the influenza. On November 23, the *Enquirer* stated that, since the outbreak of the disease in Cincinnati an average of nineteen horses had died each day; the normal rate was under three.

Dick observed the delays in the removal of carcasses from the city. He beheld the oxen slipping on the paving stones of steep streets. Soon, his Aveling & Porter engine was chuffing along, hauling wagon loads of dead horses to the fertilizer factory (Giddings 3) — a use for his engine which no one could have foreseen at the time he bought it. Under real-life conditions resembling Thurston's test, the Aveling & Porter's driver wheels adhered to the pavement. By November 30, 1872, Dick could give his faithful engine a rest, for the equine influenza epidemic had begun to wane. Businesses which had lost thousands of dollars each day looked forward to Christmas profits.

Dick's engine deserved to end its service heroically, but history hints of tragedy. Giddings said, "The engine was used . . . for several years and was then disposed of to a man in Nevada and reports . . . were that it fell over a cliff and was wrecked" (3). At last report, a similar engine exists in the United States. Rayner confirms that Arthur Bright's private collection in California includes an Aveling & Porter. Rayner has seen the engine in a videotape "shot two or three years ago by an English visitor, David Viewing, who went specifically to see it since he has a part of an Aveling tram engine . . . which was made around 1865 . . . " (1). The Iron-Men Album Magazine for November/December 1950 published an article by Higgins which featured the Aveling & Porter now owned by Bright. His engine embodies a design which, by the 1870s, was sufficiently advanced to come to the rescue during an epidemic.



Aveling & Porter's Road and Farm Locomotive. Cut from the front page of the Pacific Rural Press of August 12, 1874.

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Note: This essay answers a question raised by Mr. Tom Downing in an article in the February/March 1998 issue of E&E entitled A New Outlook From An Old Source pages 12 and 13. Downing's piece asks for more information abut a nineteenth-century horse epidemic that led to the use of an Aveling steam traction engine to haul dead horses from downtown Cincinnati.