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WEEKLY.

NATURAL RESOURCES OF VIRGINIA AND WEST VIRGINIA.

BY B. G. UNDERWOOD.

In natural and varied resources, Virginia and West Virginia are unrivaled, and the marked advance made by both of these commonwealths during the past decade is worthy of note.

Virginia, as one of the original thirteen States, held first position up to the census of 1810, and, owing to the separation of West Virginia, in 1863, was No. 10; 1880, No. 14; and in 1890, No. 15. West Virginia gained one point in the last census, being No. 29 in 1880 and No. 28 in 1890.

We have preferred in the present

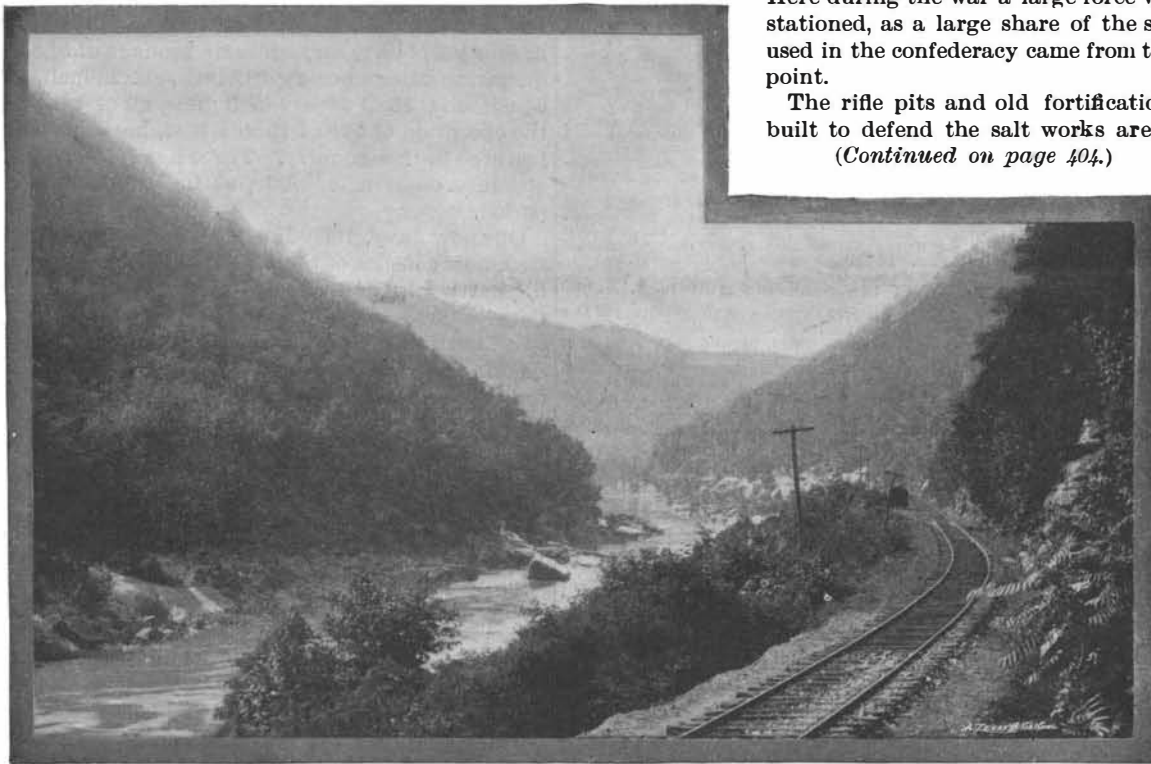
article to show a few of the many beautiful views with which both States abound, rather than any of the many manufacturing establishments which have lately been so largely established.

On this page is given one of many beautiful views on New River near Thermal, West Virginia, on the line of the Chesapeake and Ohio Railroad.

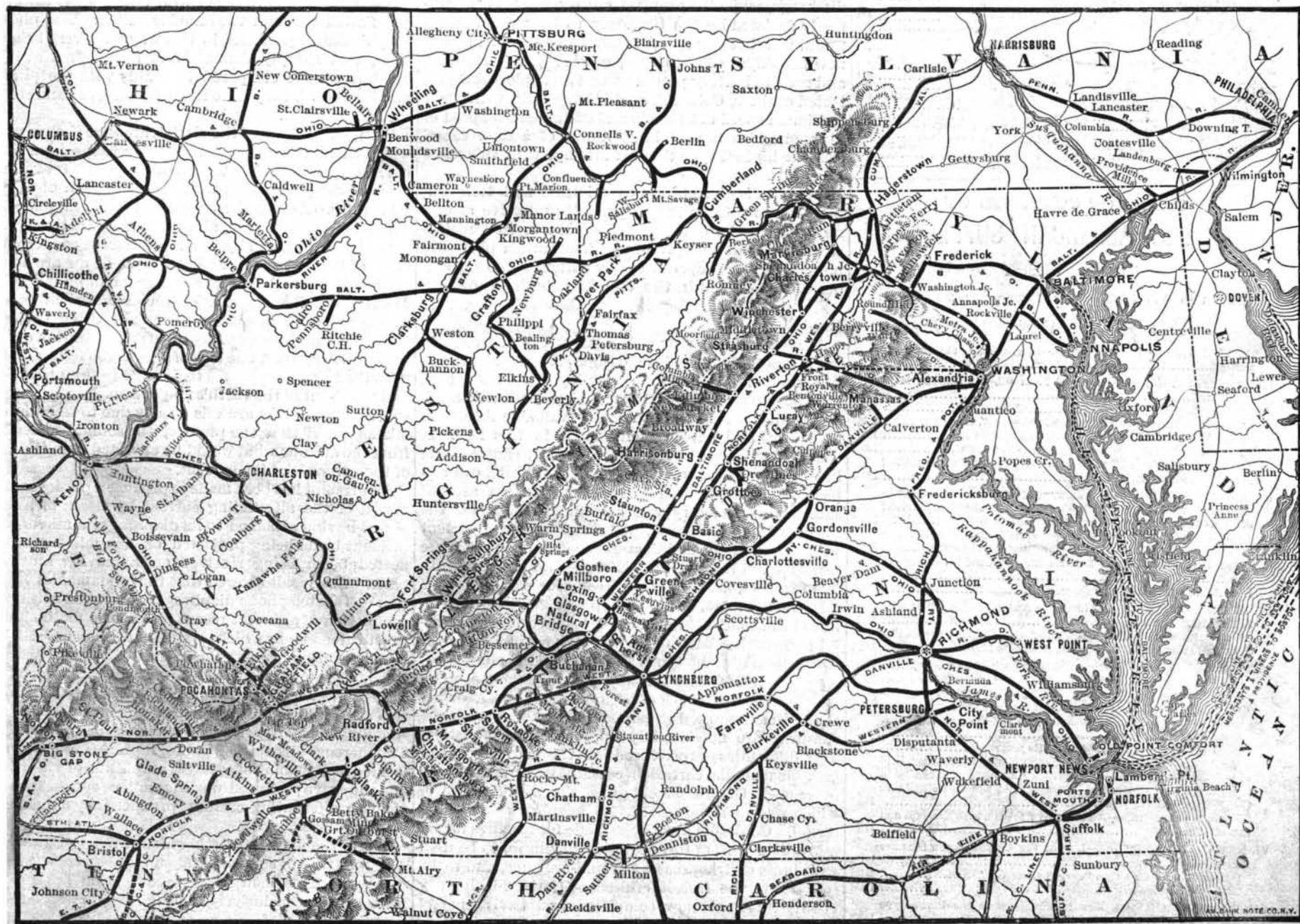
Salt-peter Cave, which has a peculiar history, is given on another page. From this cave the confederate government obtained niter for use in manufacturing gunpowder, and it was guarded during the war. It is situated near Natural Bridge, and below the mouth of the cave the little stream flows which runs under Natural Bridge. Saltville, Virginia, is also shown.

Here during the war a large force was stationed, as a large share of the salt used in the confederacy came from this point.

The rifle pits and old fortifications built to defend the salt works are in (Continued on page 404.)



ON NEW RIVER CHESAPEAKE AND OHIO RAILROAD, NEAR THERMAL, W. VA.



VIRGINIA AND WEST VIRGINIA—INDUSTRIAL TOWNS AND CITIES, RAILROAD TRUNK LINES AND STEAMSHIP ROUTES.

NATURAL RESOURCES OF VIRGINIA AND WEST VIRGINIA.

(Continued from first page.)

plain view of the railroad. About 10,000 tons of fine salt are shipped annually, and it is proposed to enlarge the works and double the production at an early date. The brine from these salt wells is stronger in saline matter than from any other salt well in this country.

The comparative table of population of some of the more important of these towns during the past ten years which we publish in this issue will show how marked has been the progress made, Roanoke, Virginia, and Huntington, West Virginia, showing the largest percentage of gain. The former is one of the solid cities of the new South, and while the location of the shops of the Norfolk and Western system gave it its start, the many large industrial concerns that have since located at this point give evidence of the solid growth of the place. We give a view of Crystal Spring Park, which is located in Roanoke. This is delightfully situated, and derives its name from the famous spring from which the city receives its water supply, and it gushes in apparently inexhaustible supply from the limestone mountain near the city.

Both Virginia and West Virginia are rich in minerals of all kinds, particularly in coal and iron, and the mines in the Pocahontas region of West Virginia, which produce a superior kind of steam coal, are noted, and it has become necessary to double track the railroad to Lambert's Point, Norfolk, to bring this coal to tide water.

The foreign and coastwise commerce of these States has grown very rapidly, and on one page we show the three great shipping points for the three trunkline roads that reach the Atlantic. Newport News, the outlet for the Chesapeake and Ohio, has increased very rapidly, as it was not incorporated in 1880. Here is located the large shipbuilding establishment, which is one of the most complete in this country, and from this port



SALTVILLE, VA.—NORFOLK AND WESTERN RAILROAD.

published elsewhere, increased from 557 in 1880 to 2,018 in 1890.

Lambert's Point, which is the outlet of the Norfolk and Western Railroad, has grown very rapidly, and during the year 1891 handled almost 1,700,000 tons of

the rapid development of the many industrial towns which have so recently come into existence.

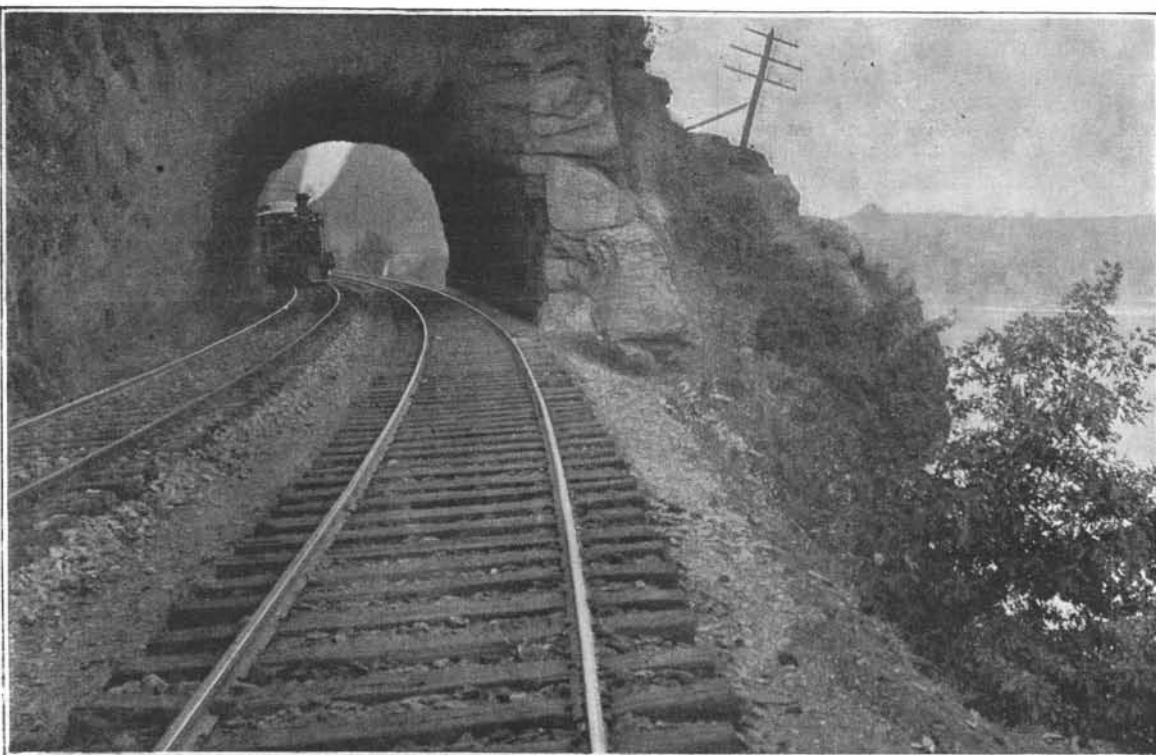
POPULATION OF INDUSTRIAL TOWNS AND CITIES IN VIRGINIA AND WEST VIRGINIA FOR 1880 AND 1890.

Virginia.

Cities and Towns.	Population.		Gain in Percentage.
	1890.	1880.	
Richmond.....	81,388	63,600	27.97
Norfolk.....	34,871	21,966	58.75
Lynchburg.....	19,709	15,959	23.50
Roanoke.....	16,159	609	2,315.40
Danville.....	10,305	7,256	36.93
Manchester.....	9,246	5,729	61.39
Charlottesville.....	5,591	2,676	108.93
Newport News.....	4,449	.....	.....
Berkeley.....	3,899	.....	.....
North Danville.....	3,799	1,200	266.58
Suffolk.....	3,254	1,963	70.86
Salem.....	3,279	1,759	86.41
Pocahontas.....	2,953	.....	.....
Bristol.....	2,902	1,562	85.79
Luray.....	2,809	632	344.46
Wytheville.....	2,570	1,885	36.34
Pulaski.....	2,112	.....	.....
Radford.....	2,060	.....	.....
West Point.....	2,018	557	262.30
Total for State.....	1,655,980	1,512,565	9.48

West Virginia.

Cities and Towns.	Population.		Gain in Percentage.
	1890.	1880.	
Wheeling.....	34,522	30,737	12.31
Huntington.....	10,108	3,174	218.46
Parkersburg.....	8,408	6,582	27.74
Charles town.....	6,742	4,102	60.83
Benwood.....	2,934	.....	.....
Moundsville.....	2,688	1,774	51.52
Hinton.....	2,570	879	192.38
New Cumberlandtown.....	2,305	1,218	89.24
Total for State.....	762,794	618,457	23.34



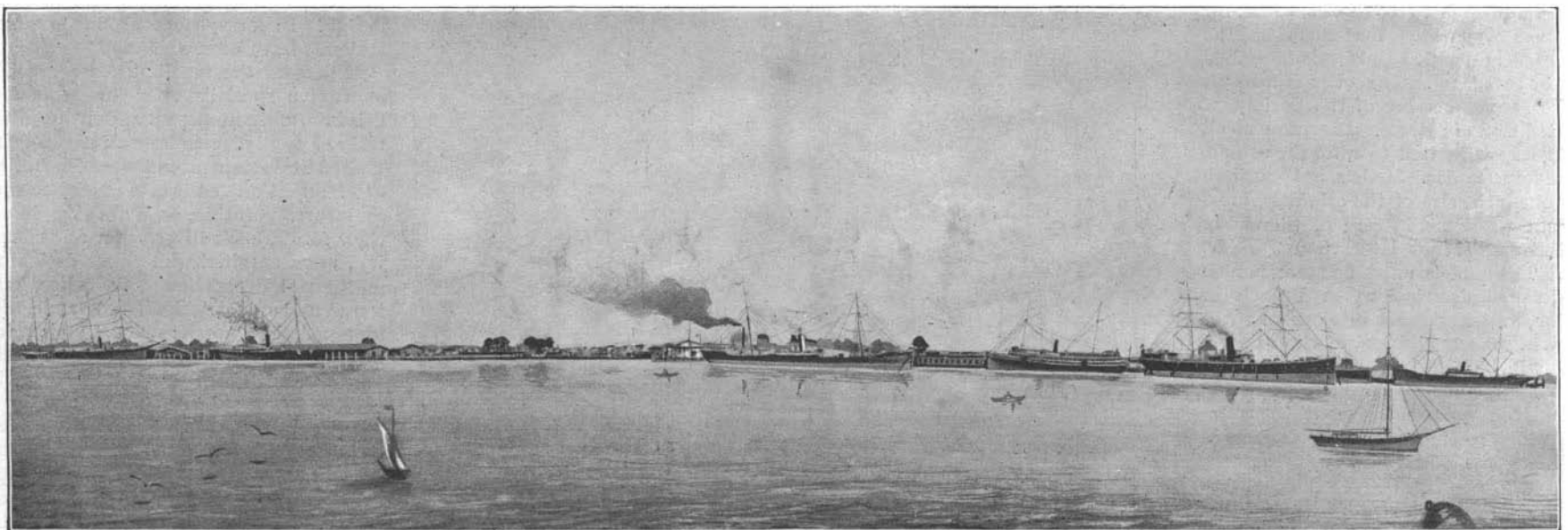
ABOVE HARPER'S FERRY—BALTIMORE AND OHIO RAILROAD.

it is proposed to run a new steamship line, consisting of six first-class vessels, to Liverpool.

West Point is the outlet for the Richmond and Danville Railroad and is one of the largest cotton shipping ports in this section, standing second to Norfolk. The population of this place, as will be seen from the table

freight, or about 30 per cent of all carried by this road. Virginia and West Virginia are fortunate in having railroads within their borders with such liberal ideas, and to the Baltimore and Ohio, Chesapeake and Ohio, Richmond and Danville, and Norfolk and Western, is due the marked advance made by these States and

The shipments of coal and coke transported over the Norfolk and Western Railroad since the completion



WEST POINT, VA.—SHIPPING PIERS OF RICHMOND AND DANVILLE RAILROAD.

of their New River Division to the Pocahontas Flat. Top coal fields have been as follows:

	Coal. Net Tons.	Coke. Net Tons.
1882.....	4,735	.....
1883.....	82,043	23,762
1884.....	215,818	56,360
1885.....	603,416	48,571
1886.....	870,614	59,021
1887.....	1,157,423	151,171
1888.....	1,567,983	202,808
1889.....	1,813,745	310,504
1890.....	2,044,567	433,319
1891.....	2,341,226	466,016
1892 partly estimated.....	2,950,000	550,000

The shipments at the present time are far behind the orders, owing to scarcity of transportation facilities.

West Virginia has more square miles of coal than Great Britain, Germany and France combined, and though her development career has just begun, she stands fifth in point of coal production in the United States. A table of the output for the years 1888, 1889 and 1890 is given herewith:

District.	Tons 1888.	Tons 1889.	Tons 1890.
From Elk Garden.....	564,397	576,047	774,904
From Kanawha, per C. & O....	1,000,000	1,700,000	2,000,000
From Kanawha, by water. ...	1,350,000	1,200,000	1,250,000
From line of B. & O. road....	650,000	750,000	900,000
From other sources.....	500,000	500,000	500,000

Making a total product for years named:

1888.....	4,700,000 tons.
1889.....	4,726,000 tons.
1890.....	5,424,904 tons.

We also publish a view of Danville on the Dan River, on Richmond and Danville Railroad. This place is growing rapidly and many factories are being located at this point.

Radford, Va., on the line of the Norfolk and Western Railroad, is also illustrated. It is delightfully situated on New River, as shown in the cut, and is growing very rapidly, having more than doubled in population since the census of 1890 was taken.

The view of the Shenandoah Valley which we give was taken from the Baltimore and Ohio Railroad, and is the best farming region of these States.

At the Bertha Zinc Works, Pulaski, Va., zinc of the best quality is made, and it is used at the United States mint in Philadelphia, and is there regarded as the standard.

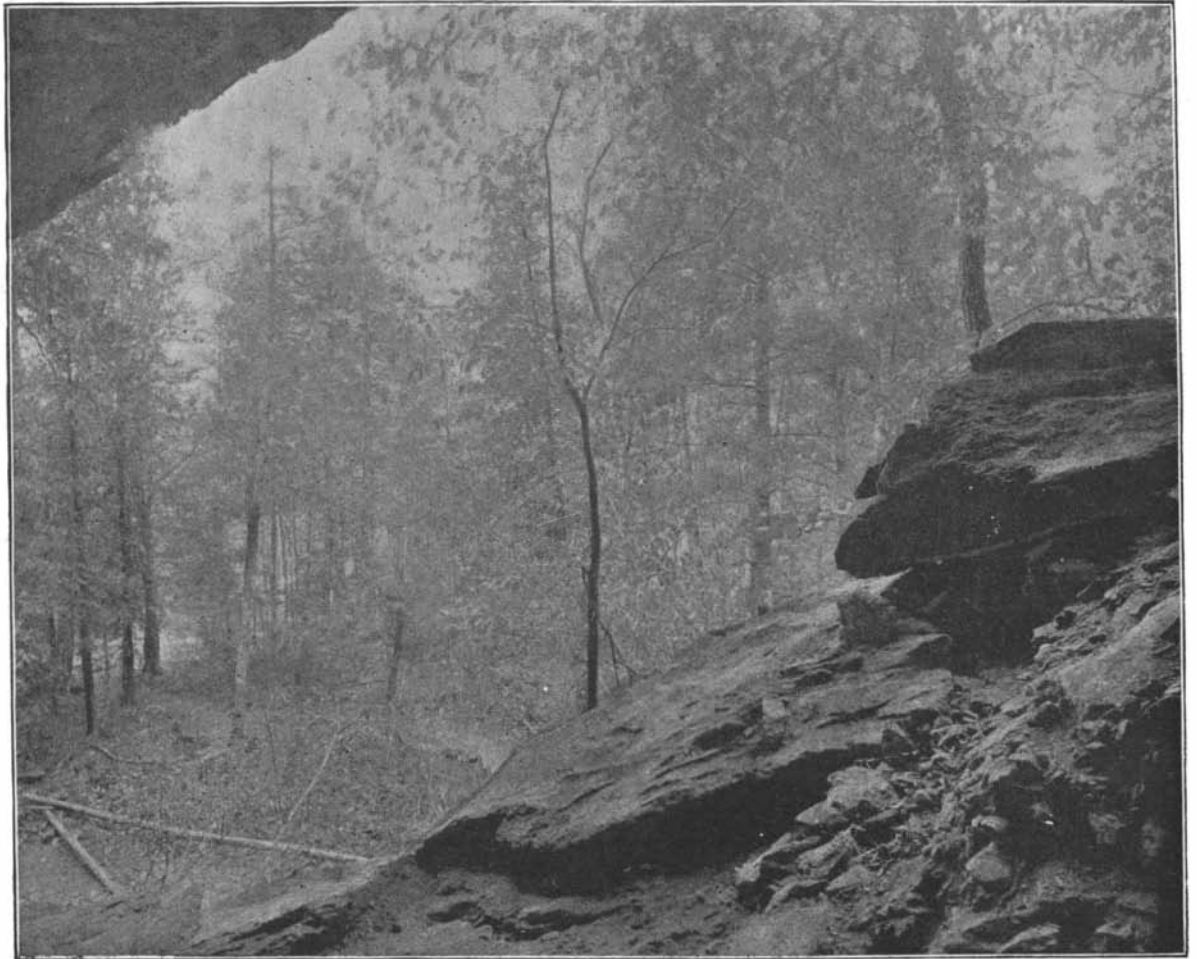
The only views we have given in the vicinity of Norfolk are of Newport News and Lambert's Point, which are the outlets of the trunk lines that bring coal and iron to tide water.

We are unable to give the production of these States for 1890, as the Census Office has not yet completed the tables, but enough is known to show that they will take their place among the great manufacturing sections of the country, and for beautiful and diversified scenery they stand to-day unrivaled.

Brick Pavements.

There were put down last fall nine and three-quarter miles of vitrified brick pavements in Evansville, Ind. The brick used was from New Cumberland, W. Va., and the foundation was of broken stone, with only one layer of brick. Brick pavements have been used for years in Evansville, and also Decatur, Ill., and have given the greatest satisfaction. In Decatur one pavement has been down for several years,

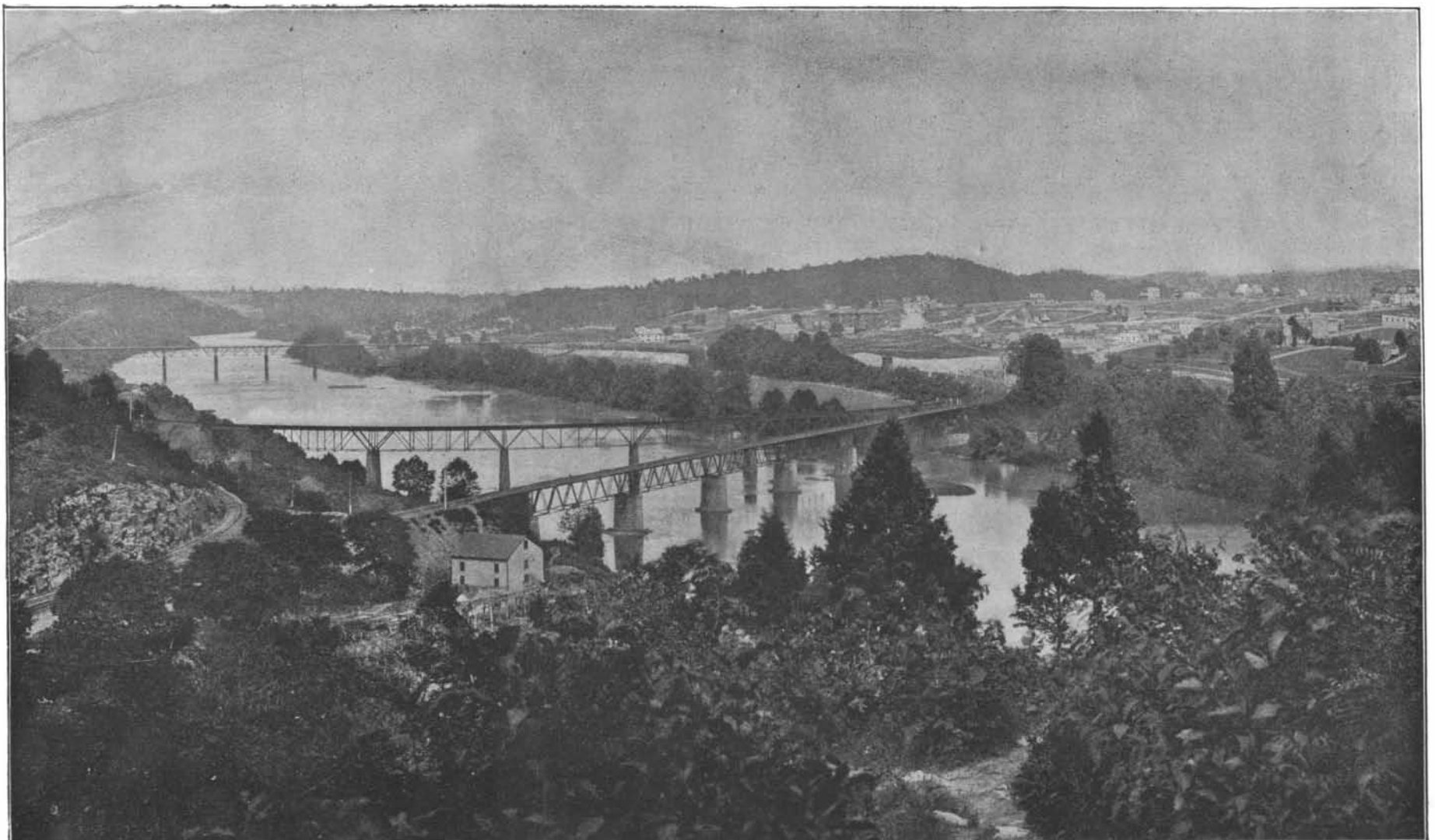
is practically as smooth as asphalt, and will retain an even surface, which no other pavement does so satisfactorily as brick. It is easily repaired, and when it is necessary to take it up for the purpose of tapping or repairing sewers, water or gas pipes, or for any other purpose, the work can be done by ordinary workmen, while a limited number only of skilled and high-priced workmen can repair asphalt pavement, and only, moreover, in certain kinds of weather. It



SALTPETER CAVE, NEAR NATURAL BRIDGE, VA.

and no repairs have been necessary yet, and the general assumption is that the pavement will remain in good condition for at least twenty years yet. There can be no doubt that the coming pavement is to be constructed of vitrified brick. It is the nearest approach to the ideal pavement for city streets. It is not so dusty as asphalt, which, in this respect, is highly objectionable. Brick pavement, too,

has been truly said that "the best pavement is the one most easily repaired." The necessary repairs to water and gas pipes alone should convince every one of this fact. Cities can construct and maintain a vitrified brick pavement at less cost than any other kind of material. The life of this pavement has been put at twelve years, but twenty-five years represents more truly its average lasting capacity.—*Clay Record.*



RADFORD, VA., ON NORFOLK AND WESTERN RAILROAD.

The Atlantic Steamers.

The development of the machinery of Atlantic liners was the subject which Mr. Arthur J. Maginnis, M.I.N.A., the well known engineer and surveyor, Liverpool, had for a most interesting and valuable paper which he read before the Liverpool Engineering Society,

Commencing with side lever engines for paddlewheel vessels, the various types of machinery of this class were described, followed by descriptions of screw-propelling machinery, in the various forms of beam, steeple, oscillating, and other geared screw engines, also various types of direct-acting engines, and the evolu-

in 1840, the machinery alone would nearly equal the whole of the displacement of the vessel, as it would reach 18,750 tons, and would require a consumption of something like 1,500 tons per twenty-four hours.

But while he was able to point out the great improvements that had been made on the marine engine,



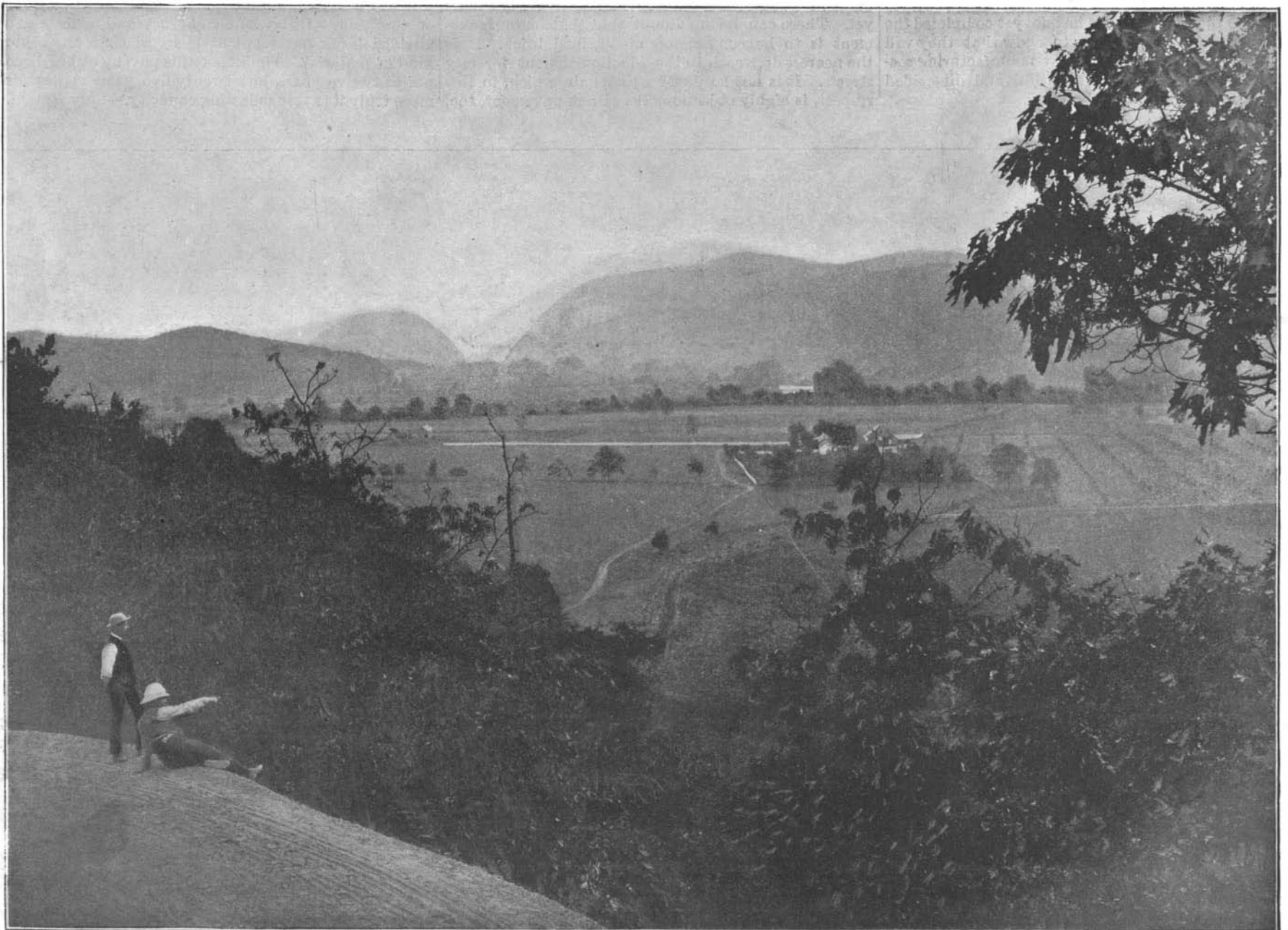
ROANOKE, VA.—VIEW IN CRYSTAL SPRING PARK.

on the 9th of November. The *Steamship* gives a summary, from which we derive the following:

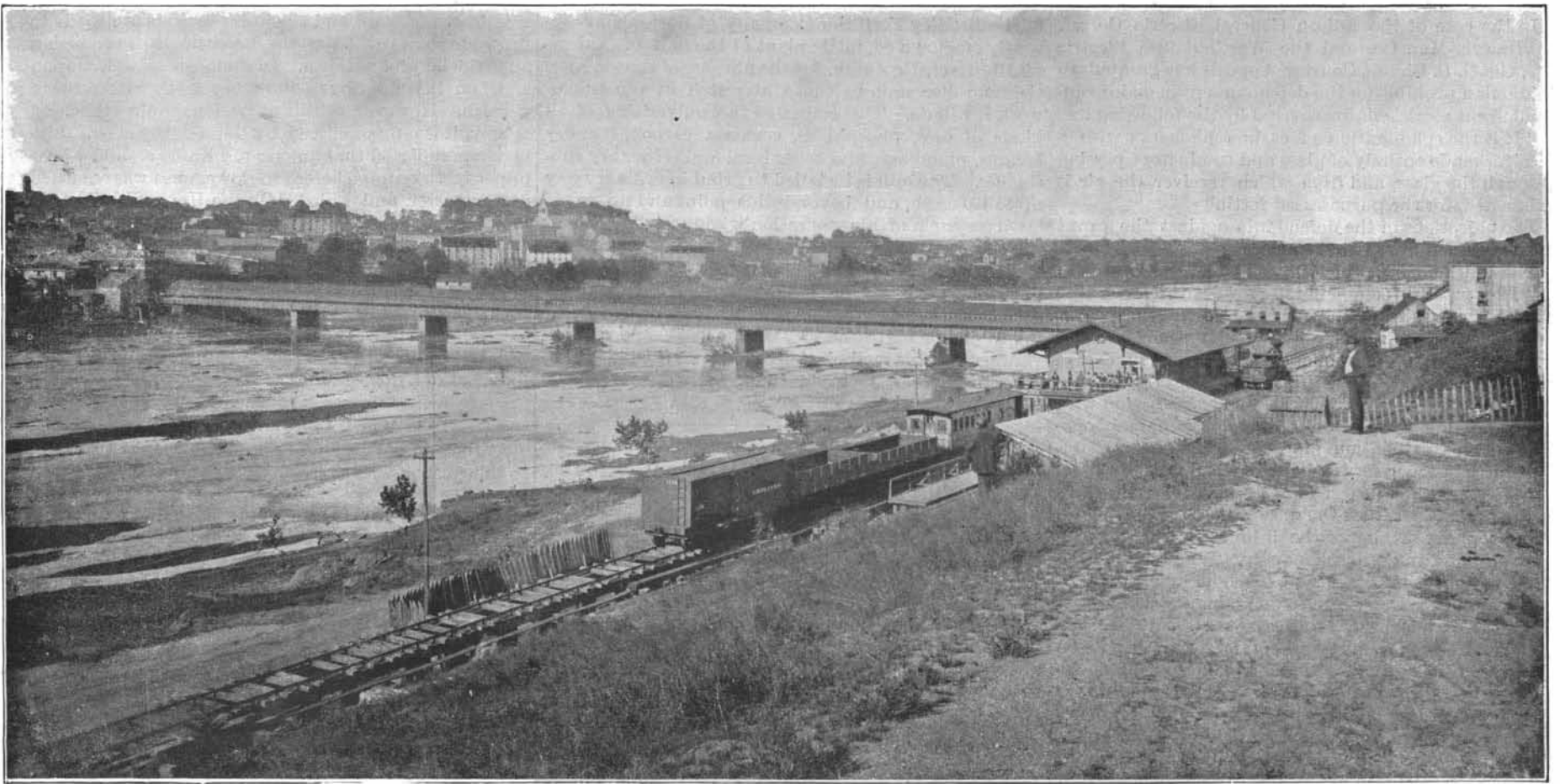
Mr. Maginnis pointed out the gradual development in the horse power, displacement, and speed of various representative vessels, from the Savannah in 1819 to the coming Cunarder *Campania*, which was estimated to represent 20,000 tons displacement propelled 22 knots with 1.5 indicated horse power to the displacement ton.

tion to compound and triple-expansion engines. He also pointed out the gradual saving which had been effected in the weight of the engines per horse power, as well as the saving in the consumption of fuel. As showing the difference in the weight of the machinery nowadays as compared with fifty years ago, the author instanced the striking fact that if the 30,000 horse power engines of the *Campania* were to be built the weights possible

the author was unable to allude to any great change or advancement in the efficiency of the boiler. That the marine boiler is at a standstill, as it were, in the matter of efficiency, has long been matter for surprise, and it is to be hoped that it may now receive a little more attention than in the past. The pressing need of improvement was commented upon to reduce the weight and space occupied on board ship, and it was noticed



VIEW OF SHENANDOAH VALLEY, VIRGINIA, FROM BALTIMORE AND OHIO RAILROAD.



DAN RIVER BRIDGE DANVILLE VA., ON RICHMOND AND DANVILLE RAILROAD.

that of all the various forms used, marine engineers looked to the locomotive type as coming nearest to meet their requirements in the future. With the improvements in the feed and general working of boilers which have taken place, the author considers that the successful working of this class of boiler is now within measurable distance; and he says it now "only remains for an enterprising Atlantic line and engineering firm to take the step and test it under the favorable conditions now existing." That the step is well worth considering might be seen from the comparison drawn by Mr. F. C. Marshall, in a paper read before the Institution of Naval Architects, in 1888, which, among other war vessels, gave two of exactly equal indicated horse power, one with modified locomotive and the other with naval boilers, the weights with water being in the former 49 pounds per indicated horse power and 74 pounds in the latter, so that the locomotive boiler effects a saving in weight of 33 per cent. This, in the weight given for the new *Campania*—viz., 1,200 tons—would mean a gain of 400 tons in earning weight.

There is a very pleasing feature in connection with the Atlantic traffic which Mr. Maginnis takes special note of toward the end of his paper, and that is the great immunity from breakdown of machinery which at present characterizes the vessels engaged on the Atlantic ferry. Although the voyage "is admittedly the wildest and most trying in the world," the author

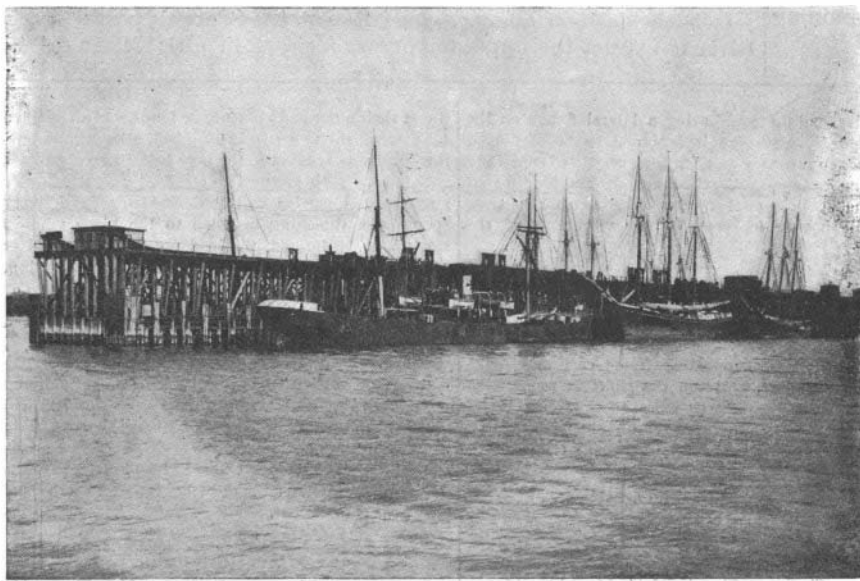
says that, taking the year ending 1st October last, out of a total of nearly 4,000 departures from port, or an average of 74 per week, he had only been able to trace seven breakdowns of machinery which caused serious delay, and only three total disablements. That there should

although redounding to the credit of both builders and owners in proving that the best designs, materials, and workmanship have been utilized, it would be idle to deny that were it not for the care and attention taken and given by the engineers in charge at sea—the men who bear the heat and brunt of the day, from the chief downward—the result would not be so satisfactory nor the advances which have been made become practicable.

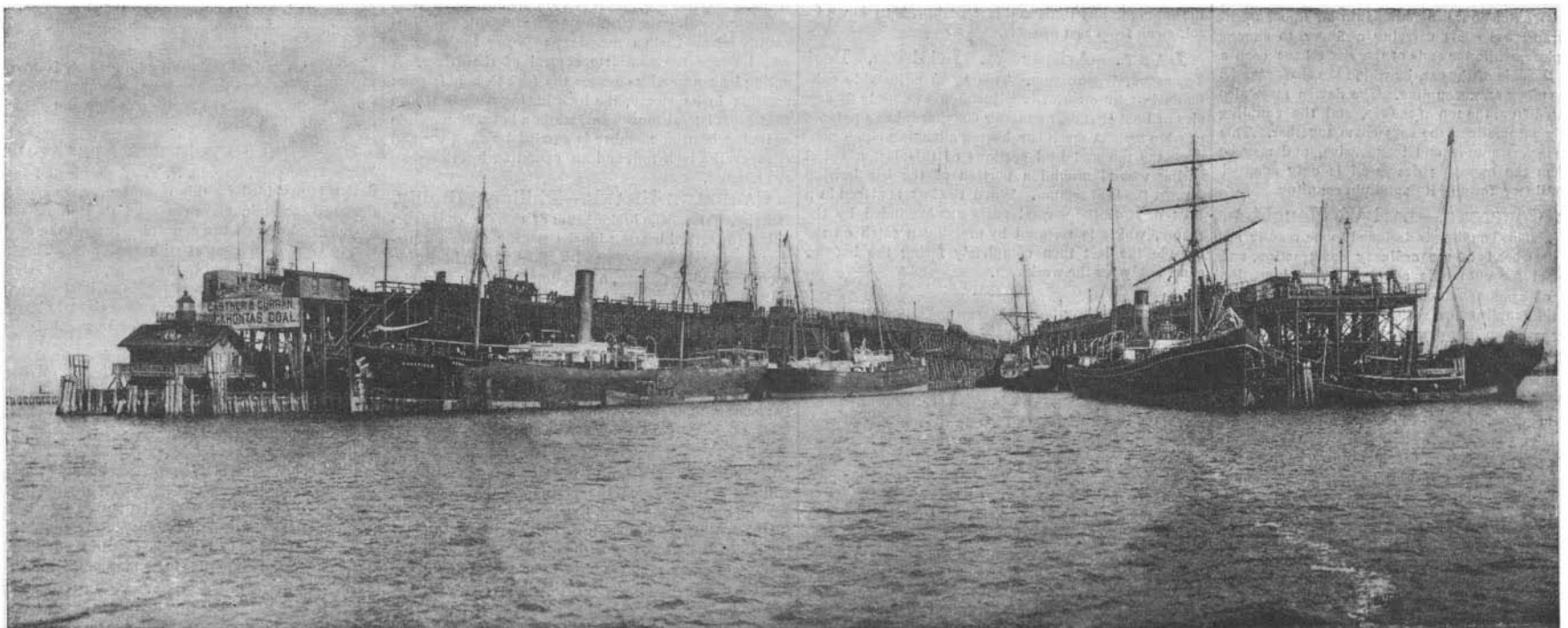
Lanoline.

Wool fat contains wax-like substances, which are produced by the splitting up of the cholesterin, isocholesterin, and higher alcohols. This wax detracts from the medicinal fitness of wool fat, and Dr. Benno Jaffe and Dr. Ludwig Darnstadter have devised a process for effecting an improvement. This process consists in dissolving the wool fat in benzol, toluol, ether, chloroform, or other suitable solvent, several of which are named, and adding to the solution ethyl or methyl alcohol, which has the effect of throwing out the wool wax proportionately to the amount added. An alternative method is to dissolve the crude fat at its melting point in fusel oil, and it is found, on cooling, that the wool wax crystallizes out. The result in either

case is that the purified fat is much improved, especially in consistency, and it makes "an excellent lanoline" on further treatment by the applicants' well-known process.



NEWPORT NEWS VA.—SHIPPING WHARVES CHESAPEAKE AND OHIO RAILROAD.



LAMBERT'S POINT NORFOLK, VA.—SHIPPING WHARVES OF NORFOLK AND WESTERN RAILROAD.

The Great Electric Light Suit.

In the case of the Edison General Electric Co. vs. the Sawyer-Man Co. and the Westinghouse Electric Co., the U. S. Circuit Court of Appeals has granted an injunction prohibiting the defendants from making incandescent electric lights covered by the following:

"It is the combination of carbon filaments with a receiver made entirely of glass and conductors passing through the glass, and from which receiver the air is exhausted, for the purposes set forth."

The objections of the defendants against the grant of the injunction were overruled.

The court, among other things, holds as follows:

"The present complainants are entitled by the patent laws to a monopoly for the term of the patent of the manufacture and sale of the lamps made under it. The right to this monopoly is the very foundation of the patent system. They do not lose that right merely because they may have joined in a combination with others holding other patents securing similar monopolies, which combination may, when judicially examined in the proper forum, be held to be unlawful.

"We do not feel justified in assuming upon the facts in the present suit that the use which the complainants propose to make of the injunction will be such as to promote any other monopoly. When it shall be made to appear that some one, to whom in fairness and good conscience these same complainants should sell their lamps, has been arbitrarily refused them, save upon oppressive and unreasonable terms, it will be time to consider whether the complainants should be allowed to continue in possession of the injunction.

"The injunction order appealed from should be modified so as to cover only lamps made in infringement of the second claim of the patent, the other claims not having been infringed according to the adjudication of the circuit court or of this court. It should also contain a provision reserving the right to the defendant to move hereafter for the vacation, suspension, or modification of the injunction upon proof of specific instances of refusal upon the part of the complainants, or either of them, to supply the lamps of the patent upon terms reasonable under the circumstances of the particular case to the owners of electric light plants which were installed before the rendition of the interlocutory decree of the circuit court sustaining the validity of the patent."

A Pulverizing Mill Plant in Brooklyn, N. Y.

The Bradley Fertilizer Company, of Boston, have recently erected a complete plant at the foot of Thirtieth Street, Brooklyn, for the purpose of showing the Griffin roller mill to those interested in the kind of work it will do. This embraces the pulverizing of all kinds of ores, phosphates, cements, carbon, foundry facings, plumbago, and other hard and refractory substances. The mill is installed to grind in ordinary way up to 100 mesh, and beyond this point and up to 250 mesh a system of air separation is connected, thus exhibiting a plant in actual operation with a range from 80 to 250 mesh, the product of the mill being delivered, finished, and of any mesh desired. The company express a willingness to grind samples for any one desiring to judge of the quality of the work and the advantages of this method of grinding. A full illustrated description of the Griffin roller mill appeared in the SCIENTIFIC AMERICAN of August 6, 1892.

Teeth Mutilation.

Dr. Magitot, of Paris, has published an interesting account of the mutilation of the teeth practiced by various savage tribes. One variety, which is chiefly met with on the coasts of Africa and the west coast of New Guinea, consists of the breaking of a portion of the incisor by means of a knife and a piece of wood, and is performed between the ages of twenty and twenty-five. The custom of extracting the two central incisors is found in both hemispheres. According to Zerate, it has been practiced in Peru from time immemorial, where it is inflicted on conquered tribes as a sign of slavery. In Africa it has been observed on the Congo, among the Hottentots and the Batoxas. The mutilation by filing has for its exclusive center the Malayan Archipelago, whence it has spread to the adjoining islands. It is a religious act, which is celebrated with great festivities at the age of puberty, but this only by the Mohammedans. The degree and character of this filing vary with the habits of the family or caste. The operation is performed by an expert, the *Tukang panger* (filer), by means of a chisel, three bricks, two files, a small saw, and a pair of cutting nippers, the instruments being rubbed with arsenic and lemon juice before being used.

It is the fashion among some tribes on the Senegal River to extract the upper temporary incisors in girls

when quite young and to manipulate the chin, so that it is drawn forward and the lower incisors are made to protrude so as to overlap the upper lip, thus producing an artificial prognathism. In Indo-China and Japan a girl on her marriage paints her teeth with a black varnish. However, as this operation requires time and money, it is only practiced by the wealthy class. Livingstone reported that among the Kafirs a child whose upper teeth erupted before the lower ones was regarded as a monster and killed. On the Upper Nile the negroes have their upper incisors extracted, in order to avoid being sold as slaves, because of the loss of value brought about by this mutilation. Among the Esquimaux, as described by the Abbe Peritat, in some regions there exists a custom of transversely cutting off the upper incisors, the object of this being, according to local tradition, to prevent the human chin looking like that of a dog.—*Lancet*.

A Word to Mail Subscribers.

At the end of every year a great many subscriptions to the various SCIENTIFIC AMERICAN publications expire.

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RECENTLY PATENTED INVENTIONS.**Engineering.**

STEAM GENERATOR.—Pierre A. Chatelet, Paris, France. This invention consists principally of a tubular casing closed at its ends and adapted to be heated, the casing being connected with a water charging device arranged to spray in the water in a finely divided state, while a tube open at its inner end is held in the casing to form a narrow annular space for the passage of the vapor, as it is heated by the wall of the casing, to the open inner end of the tube. The highly heated dried steam is passed from the inner tube to a steam-receiving vessel or to the engine.

SUBSTRUCTURE.—Samuel A. Oliver, Houston, Texas. This is an improvement in substructures designed to form supports for bridge piers and similar uses. Combined with the main structure is an inclosing caisson for its lower portion, a filling between the caisson and the main structure, and an inclined protecting plate for the top of the caisson. This substructure is designed to be conveniently erected and strong, amply protected against the action of water, and so built that the protective part of it may be easily renewed when necessary.

Railway Appliances.

CAR COUPLING.—Michael Werner, Allegheny, Pa. In this device the coupling hook is pivoted in the drawhead, and has a tail and lip projecting down through and into a base slot, and a top extension projecting into an upper opening, a transverse shaft carrying a finger to engage the tail piece, while the ends of the shaft have each a crank at the side of the car, by which the shaft may be rocked to effect an uncoupling. The device may also be operated from the top of the car, and the coupling is entirely automatic as the cars come together. This coupling is very simple and inexpensive, and may be used when the opposing drawhead is only adapted for the ordinary form of link and pin coupling.

CAR COUPLING.—Levi W. Houghton, Bath, Me. This coupling is designed to be readily applied to drawheads of the ordinary construction, and is arranged for automatic coupling. The invention consists of arms mounted to swing and adapted to support the coupling pin, with an arm for moving the swinging arms, and supported on the drawhead, to be engaged by a like arm on the opposite drawhead of the approaching car.

DRAW BAR ATTACHMENT.—Wilber B. Orton, Nickerson, Kansas. This invention relates to lugs to take the thrust or pull of the drawhead or drawbar spring when a car is pulling or backing up. The lug plate forming the spring pocket has integral vertical solid lugs for receiving the thrust of the spring followers, the lug plate also having other novel features of construction to make the lugs strengthen the draught timbers.

SPIKE.—Emma A. Streeter, New York City, N. Y., and Bradford W. Nichols, Herkimer, N. Y. This is an improved double-shanked spike, the shanks being straight and parallel sided, with its points similarly beveled on opposite front and

rear sides, and the head having a lateral flange on the front side. This spike is designed to be employed wherever an ordinary spike may be used, and especially in laying railroad rails, the dual shanks holding so that the spike cannot be canted from side to side, and will not be loosened by the vibrations of the rails.

Mechanical.

POWER TRANSMITTING MECHANISM.—David C. Frazier, New Market, N. J. A shaft journaled in a suitable supporting frame carries a drive wheel or fixed gear, while on the shaft is mounted a tubular shaft having one or more toothed wheels arranged to mesh with the teeth on and traverse the periphery of the drive wheel, an internally toothed rim being formed on the peripheral edges of the toothed wheels. The invention also includes other novel features, the mechanism being designed to impart increased velocity and power to a rotary shaft with which it is connected.

BALL COCK.—Gaylord S. Hunter, Pawtucket, R. I. This is an improvement in hydraulic safety valves, such as are used for automatically shutting off the supply of a tank of any kind. It has a casing held in the wall of the tank, and when the water rises to the required height it lifts a float and tilts a lever to close the valve firmly upon its seat. The construction is such that, if the float or lever should be broken, the head of the water would close the valve. The device may be adjusted to automatically shut off the supply at any time, and it is designed to keep itself clean from rust or scale.

LAST.—Arthur M. Leighton, Port Townsend, Washington. This is an adjustable cobbler's last, automatically adjustable to closely fit any size of boot or shoe, no matter whether it has a pointed or wide toe. A reach bar having a locking notch connects the toe and heel sections of this last, a spiral spring wound around a portion of the bar bearing against the heel section. When the last is placed in a boot or shoe the several parts are expanded by the spring, which is released by pressing a catch on the outside, the last then completely fitting the boot or shoe, ready for the workman.

Agricultural.

PLOW.—Frederick S. Moore, Hanford, Cal. This plow is especially adapted for use in vineyards and orchards. The beam is pivoted to the forward part of a share-carrying frame, a short distance from its inner end, in which is a longitudinal slot, while an angle lever fulcrumed on the frame has on its inner end a pin working in the slot of the beam, there being between the handles a rack with which the upper end of the lever engages. With this construction the draught may be quickly and easily changed from right to left by the plowman, so that the near or off horse of a two or three horse team can walk in the furrow, and so throw the shares of the plow closer to a tree or vine than would otherwise be possible.

HAY SLING.—James M. Kellogg, Bozeman, Montana. The carrier of this device consists of a pole from which is projected a series of ropes terminat-

ing at their outer ends in rings or loops, and all adapted for attachment to a trip mechanism, a back rope having both ends secured to the pole being also connected with the tie rope of the trip mechanism. The hay or straw may be carried by this device from the delivery spout of a thrashing machine to the place where a stack is to be formed, the load not being dumped or spilled out except as it is placed in the desired position.

BRANDING TOOL.—John R. Todd, Glenrock, Wyoming. This implement consists of a tube with pointed ends, in which slides a plunger, while there is an adjustable gauge on the tube. The pointed end of the tube is plunged into an animal, and then a tag previously placed in the tube is driven inward through the tube by the plunger, the tag being left in the flesh under the hide after the tube is withdrawn. The tag cannot afterward be removed without mutilating the animal, being found in the beef only as it is marketed.

Miscellaneous.

BICYCLE TIRE.—George R. Bassett, New York City. This is a pneumatic tire on which is a tread piece, with two separate cushions between the wheel rim and tire, and a fibrous envelope around the cushion rings and between the tread piece and pneumatic tire. The improvement forms a detachable shoe, readily removable, partly or entirely, when desired, and preventing injury to the inner pneumatic tire.

BICYCLE ATTACHMENT.—Allen Matthews, Pittsburg, Pa. This is a simple device for automatically locking the steering fork, and which may be readily released when necessary to bring the steering wheel under the complete control of the driver. A spring lock normally engages the fork to hold it from rotation in its sleeve, the lock having a vertical arm held from lateral movement, while a laterally movable swinging bearing member is carried by the fork and engages the lock rod, and an operating lever engages the bearing.

CARRIAGE BRAKE.—Philippe Brailly, Bellaire, Ohio. The brake beam of this device is journaled in vertical bearing blocks resting upon a transverse spring, in connection with which are an operating rope and guide pulleys, a winding drum, foot levers, pitmen, and intermittent gripping devices, forming a brake readily operated by foot power, and in which all the operative mechanism is concealed from view and protected from the elements. The connection of the body with the rear springs is also simplified, and the several parts of the brake mechanism are automatically returned to their normal position after the brake is released.

CURRYCOMB.—George W. Neuls, Kane, Pa. The body and teeth of this implement are made entirely of wood, and the grain of the wood runs lengthwise with the teeth, the latter being so tapered that they will be thoroughly effective without producing undue irritation, and without tearing or cutting the hair. The comb is so made as to be very durable and inexpensive, means being provided for attaching the handle to the body in a very solid manner.

BRIDLE.—Alexander and Louis Hasselbauer, New York City. This invention provides a

simple and durable bit support, conveniently adjustable to properly fit the animal's head without the use of buckles or similar fastening devices. It consists of a single endless strap doubled upon itself and formed into two cheek sections and throat latch sections, bit-supporting loops being formed at the juncture of the lower ends of the side sections, while a slide or ring connects the throat latch sections above the bit loops, above which also is a nose strap, and a slide or ring connects the upper crossed ends of the cheek and throat latch sections.

COMBINATION TICKET.—Martin Ralph, Queens, N. Y. This ticket has a central continuous web, sufficiently strong to hold the tickets together, but which may be readily torn asunder when necessary, the tickets being separate upon the web, and the loss of time necessary to cut apart being thus saved. The improvement is applicable for railway coupon tickets, or for price or tag tickets, the tickets being provided in the latter case with fastening pins.

LETTER BOX.—Oliver P. Johnston and Calvin M. Gates, Butte City, Montana. This is an improved mail box for the reception of letters, papers and other mail matter, to protect the contents from the weather and keep them from the reach of unauthorized persons. The casing has at its top a letter slot and an opening to receive papers, etc., and a pivoted cap covers the slot and the opening. At one end of the casing is a door, fastened by a hasp and lock.

ELEVATOR.—Lucas M. Kuehn, Wabasha, Minn. This is a device more especially designed for use on large ice boxes and other receptacles, for conveniently elevating and depositing blocks of ice or other articles in the receptacles. It consists of a frame adapted to be raised and lowered on which is mounted to swing a platform that may be automatically tripped to move into an inclined position to deliver the elevated article into the desired place.

SHIFTING DEVICE FOR ELEVATORS.—James Flemming, Buffalo, N. Y. A simple and durable device is provided by this invention, more especially designed for grain elevators used to load or unload vessels, and arranged to conveniently shift the elevator leg, to hold it in contact with the grain. The leg is pivoted at its upper end to the frame, while a swinging arm pivoted to the frame engages at its free end the back of the elevator leg, a counterweight holding the free end up against the leg, novel means being provided for operating the swinging arm.

GUN.—Robert A. Steinert, Washburn, Wis. The breech of this gun has a transverse recess in which is mounted a sliding breech-block carrying a spring-projected firing pin engaged by a detent, a cam or incline on the breech being adapted to retract the pin, for which there is also a releaser adapted to release the pin when the breech block reaches its inner or closed position, or which may be moved into inactive position. The construction is simple and durable, and arranged to securely lock the cartridge in place for firing and at the same time actuate the firing pin.

OIL FILTER.—Oskar Lindberg, Helsingborg, Sweden. This is a sectional filter, which may be readily taken apart, cleaned and put up again, and its construction is such that the oil placed in the upper