

boxes on the inner side, but this rendered them much more difficult of access, and at the same time there was a greater tendency for them to blow out with the steam pressure. The length of bearing also obtainable for the axles was much less. In drying machines as usually constructed, the practice has been to introduce the steam to the cylinder by means of a steam pipe connecting from the exterior through the end of the journal by a countersunk joint. This arrangement did not allow of free expansion and contraction of the cylinder, and caused the end of the journal to press against the end of the steam pipe with more or less force, depending on the temperature to which it was raised, producing consequently more or less friction.

Motion is communicated from one cylinder to another by cast iron gearing, seen very distinctly in the engraving. The cylinders are carefully made, but no special balancing is required, such as is necessary in drying machines for paper making, the material to be dried in the present case being of much stronger texture.

In machines with wide cylinders, where more than one width of material is dried at the same time, the steam is so applied that each width is dried uniformly. A uniformity of temperature is maintained throughout the machine by allowing the steam to enter the top cylinder at one end, and the corresponding bottom cylinder at the other. The working pressure of the steam is usually from five to ten pounds per square inch, and it is controlled by an efficient regulator. The water of condensation is removed from the opposite end of the cylinder to that at which the steam enters, by means of Collins' patent trough, a device very extensively used in England, and quite effective in its operation, causing the water to pass out through the journal in a similar way to that by which the steam enters at the other end. The material to be dried, before entering around the cylinders, passes first through a "stretcher," made of brass, which prevents the edges from turning down, and smooths out all wrinkles, delivering it perfectly even and regular. The tension of the fabric is controlled by passing it between three rectangular bars, alternating above and below them, one after the other, and around a roller; or in another way by means of a strap and weight attached to the roller, from which it moves on to the drier.

ENGINEERING INVENTIONS.

An improved aerial ship has been patented by Mr. Watson F. Quinby, of Wilmington, Del. The peculiar construction of this machine cannot be described without an engraving. The upward as well as the lateral movements are made by winged-wheels of novel construction.

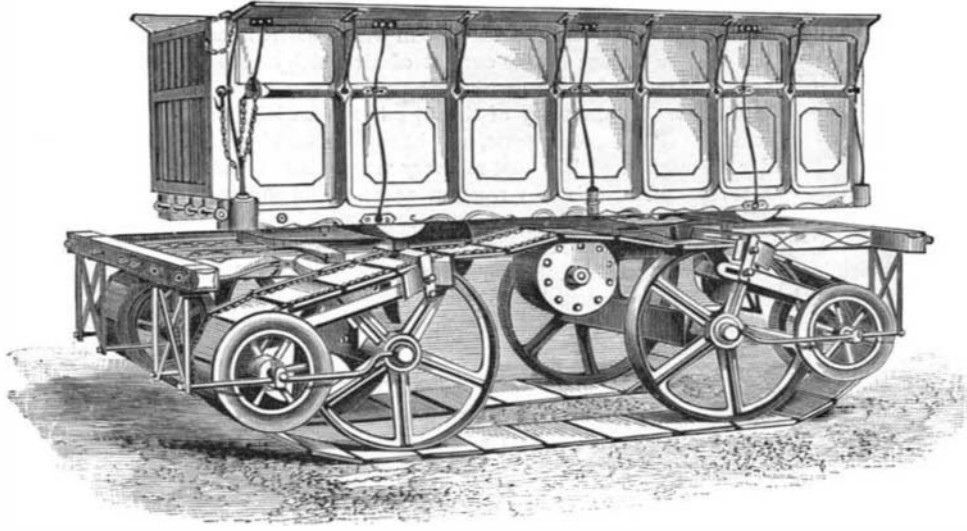
An improvement in permanent ways for tramways has been patented by Mr. Silas Nicholls, of St. Clement Danes, County of Middlesex, England. The object of this invention is to construct a tramway capable of resisting for a lengthened period the damaging effects of rain, frost, and snow, and in which the tram rails and the paving of the road on either side of them are kept firm and (so far as the durability of the road materials will admit) of uniform surface level. The invention enables the rails (when the road paving is fairly worn below their level) to be lowered until they are again flush with the surface of the road without taking up the whole of the paving between the rails.

Mr. George W. Dixon, of Spring Lake, Mich., has patented an improvement in valves for steam pumps, the object of which is to simplify the construction of valves for direct acting steam pumps, and thereby reduce the first cost of such pumps and the expense of repairs. The improvement consists in a double seated slide valve, similar to the ordinary slide valve fitted within a case in the steam chest, in which the valve slides, the space at the ends forming steam chambers, into which the steam is admitted alternately to move the slide valve. The admission of steam to the chambers is effected by means of an auxiliary valve in the steam chest, which is operated by means of shifting levers that are acted upon by the piston head in the engine cylinder.

An improvement in railroad frogs has been patented by

Mr. Michael McAleenan, of Peoria, Ill. This invention relates to the joint or intersection of the rails of railroad frogs. It is designed to strengthen the joint and prevent dislocation. The improvement consists in prolonging the web and base of one rail in the form of a tongue, that extends toward the point of the frog in the space between the head and base of the other rail.

An improvement in gates for railroad crossings has been patented by Mr. Thomas Meehan, of Brooklyn, E. D., N. Y., and Mr. Colin McLean, of Jamaica, N. Y. The invention consists in the combination of a vertical frame provided with the side posts, and the two trusses for supporting suspended railroad gates and their operating mechanism. Two sets of chains or ropes, and two sets of pulleys, two weights, and four pairs of bevel gear wheels, are employed in moving the gates and retaining them in the required position.

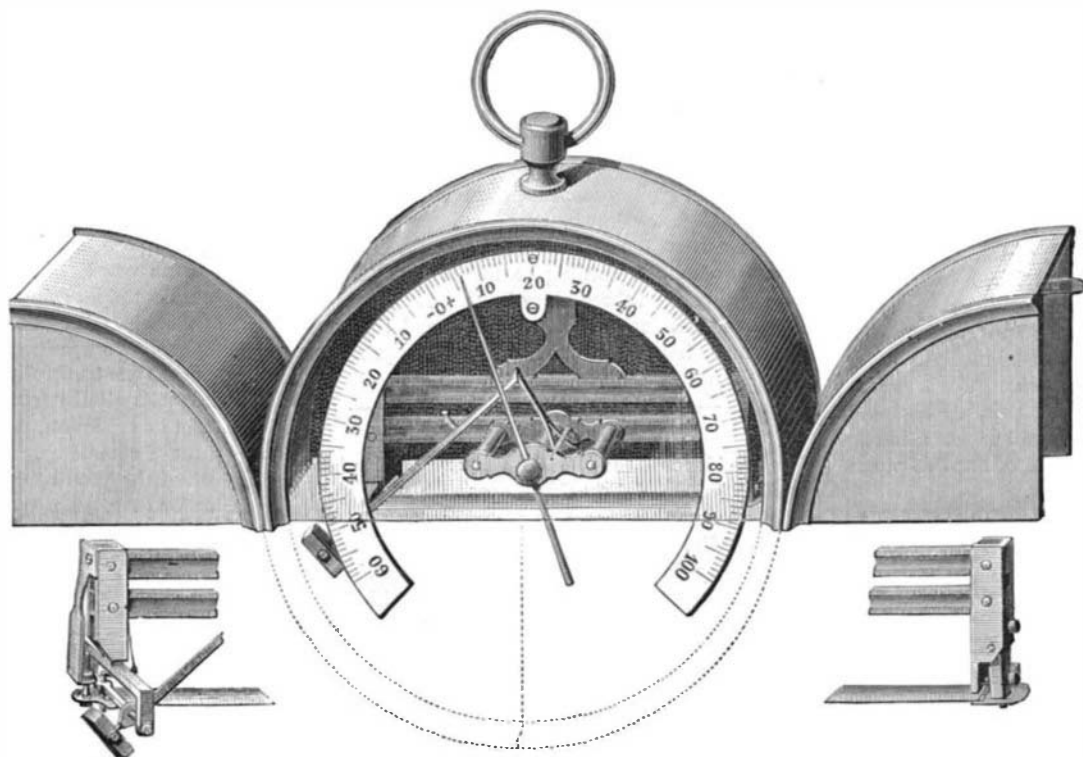


SELF-LAYING TRAMWAY.

Mr. Harrison Gillett, of Lake City, Minn., has patented an improvement in steam generators fitted for burning straw or hay. The object of the invention is to provide a regular and uniform feed of the material without requiring the fire-doors to be opened, to prevent ashes and sparks entering the boiler flues, and to effect the removal of ashes as fast as they accumulate. The inventor makes use of a cylindrical boiler fitted with an inner cylindrical fire space, smoke box, and return flues through the water space. The fire doors at the front are fitted with adjustable feed rollers driven by gearing and a feed table. At the rear of the fire box ash and spark arresters are fitted, and the smoke and ash box is fitted with a pipe from the boiler for wetting down the ashes, and with a spiral conveyer for delivering the ashes to the outside.

New Brake.

A novel form of railway brake has been invented by Mr. W. Wiseman, of the East Indian Government Railway Department. In the specification it is stated that sand is placed



A NEW METALLIC THERMOMETER.

in a chamber fitted with valves, which when opened allow the sand to pass into a second chamber, in which revolve blades attached to the axle of the vehicle. The motion of these blades is arrested by the rush of sand impinging and clogging. The above suggests the idea that a small steam turbine or rotary engine might be attached to each car axle, and by letting on steam from the locomotive, turn the wheels backward, and so stop the train.

SELF-LAYING TRAMWAY.

The vehicle shown in the engraving is fitted with a continuous self-laying and self-adjusting tramway. It was among the novelties of a recent Royal Agricultural Show, being exhibited by Mr. W. C. Pellatt, of Red Lion street, Clerkenwell, England. As will be seen by the annexed engraving, the tramway is composed of plates of hard wood, faced and strengthened with metal, and attached to two parallel endless chains, which pass round revolving guides or drums at the ends of the vehicle, and both over and under the wheels. The chief points in which this arrangement differs from others of a similar character are the gain of a fixed rail without loss of power by friction, the endless chain of plates resting on the top of the van wheels, and being carried forward by them. In this way a free and noiseless action is secured. The under carriages, constructed on the bogie principle, lock simultaneously, thus causing the front and hind wheels to run in the same track, and also enabling the vehicle to turn a very sharp corner. The shafts, however, can be fixed at either end, so as to avoid the necessity for turning in narrow or inconvenient places.

The body of the vehicle projects over the wheels, thus giving an increased capacity of over thirty per cent. A light four-wheeled van, fitted with this apparatus, and loaded up to 1 ton weight, may easily be drawn by one man; and over very heavy or plowed land, the gain is proportionately greater. In this latter case the plates of the endless chains are constructed of a sufficient width to well cover furrows or ruts.

The first two vehicles that were constructed under this patent were a farm wagon capable of carrying from seven to eight tons, and a vehicle for goods or passengers, suitable for high speed.

A NEW METALLIC THERMOMETER.

M. Tremischini's object in the construction of this thermometer, in which the expansion of one metal alone gives the measure of atmospheric temperatures, was to do away with the two inconveniences inherent to the nature of glass—its radiating and absorbing power. It was these inconveniences that the illustrious Tyndall had in view when he remarked that a glass thermometer suspended in the air does not give the temperature of the latter.

But in selecting a metal as an indicator of temperature, the inventor has not been unmindful of the fruitless experiments of those who have preceded him in this field. So, in this new thermometer, there is no system of coupling together two or more strips of unequally expansible metals, no curves especially, of any nature whatever. The metallic strip is made of very hard laminated copper, slightly platinumized to prevent oxidation; or it may be of silver. Its thickness is only one hundredth and a half of a millimeter, so that it may possess the highest degree of sensitiveness. The dial of the instrument, on which the temperatures are marked by means of an index needle, rests on a frame which is deserving of a special description.

This frame is composed of two parallel metallic bars, one of steel and the other of copper, connected at their ends by metallic cross pieces. They are represented at the right and left of the accompanying figure. The upper horizontal cross piece, being fixed solidly to the two bars, maintains them at a constant right angle with it; while the lower cross piece, being fastened by two carefully adjusted pins, allows the two other angles of the quadrilateral to become modified under the influence of the unequal elongation of the bars. Taken as a whole, then, the frame forms a rectangular trapezium, one of whose sides (the lower one) may assume different inclinations. This movable side is prolonged beyond the trapezium, and to this prolongation, at a point previously determined

by calculation, is fixed the sensitive strip of metal. As for the opposite side of the frame, it ends in a forked appendage, the two branches of which contain an M shaped mortise, and in this rests a movable blade. It is to one of the surfaces of the latter that is attached the other extremity of the sensitive strip. As a result of this arrangement the two points of the frame, to which are fixed on the one hand the oscillating blade and on the other the sensitive strip, are

at an invariable distance apart, whatever be the variation of the temperature.

The expansion of the sensitive strip causes the oscillation of the blade, which, at its lower part, carries a lever. This lever transmits motion to the index needle through an intervening system, whose results are of a remarkable importance, since there is neither chain nor rack, nor especially any antagonistic spiral. To the bottom of the lever is fitted a very small V shaped piece of steel, the apex of which points toward the axis of the index needle. The axis contains two diverging grooves corresponding exactly with the two branches of the lever, and the latter are maintained constantly in place in the groove by means of another small piece fitted also to the bottom of the lever. It is now easy to understand that, every time that the lever receives an impulse from the sensitive strip, its V shaped appendage will necessarily transmit this motion, and that too, without any loss of time, to the axis of the needle, whatever be the degree of the impulse received, and whatever be the direction in which it takes place. In this thermometer, then, are united all the conditions that are indispensable for important observations; since, in its construction, the author has made it his object to avoid curves and the coupling of two strips, and to obviate the inconveniences pointed out by Tyndall as attending the use of glass thermometers.—*Le Nature*.

MECHANICAL INVENTIONS.

Mr. Joseph V. Morton, of Winchester, Ky., has patented an improvement in balance wheels, the object of which is to connect the balance wheel with the band wheel shaft in such a way that when the wheel is moved in the direction for operating the machine the shaft is engaged, and communicates the motion through the belt wheel; but when the motion of the wheel is reversed the shaft is released, remaining stationary.

Mr. Edward Wilkinson, of Sheffield, County of Yorkshire, England, has patented an improved light and cheap form of shears, the blades, shanks, and bows of which are composed of flat steel, the whole being in one plane with the exception of the bow, which is curved sidewise, either in one regular or irregular curve, for the purpose of giving elasticity to it.

Mr. Richard J. Skinner, of Oswego, N. Y., has patented an improvement in middlings separators, which is quite simple, and will, it is said, do its work rapidly and thoroughly. The invention cannot be described without diagrams.

Mr. Wilson N. Fort, of Lewisville, Ark., has patented an improved gate composed of parallel bars, one fixed between side posts, and the remainder pivoted in lazy-tongs, on either side, which depend from the fixed bar. The upper pivoted bar is connected with a chain running over a pulley sustained on a rod connecting the two upper ends of the lazy-tongs, by pulling which the lazy-tongs are folded up or contracted and the gateway opened.

An improved tellurian has been patented by Mr. Stephen D. Engle, of Hazleton, Pa. This improvement relates to apparatus for the use of schools in teaching the science of astronomy; the object is to furnish a simple and inexpensive apparatus for presenting in a manner that may be readily understood by the pupil the various phenomena connected with the movements of the earth and moon in relation to each other and around the sun, such as the recurrence of day and night, the changes of the seasons, the eclipses, the elliptic orbit of the earth, and the passage of the sun through the signs of the zodiac, etc.

Mr. William M. Myers, of Asherville, Kau., has patented an improved churn, in which the churn body is hung as a weight on the end of a pendulum rod that is vibrated by an escapement and wheel driven by spring or other power. By this means the required agitation of the milk or cream is secured with the expenditure of a small amount of power.

An improved machine which will pare, core, and quarter apples without removing them from the fork, has been patented by Mr. Thomas G. McConnell, of Collinsville, Ill.

Mr. William C. Hooker, of Abingdon, Ill., has invented a trap for catching small animals, such as rats, gophers, and minks, by setting the trap in the holes and runways frequented by such animals; and it may also be used for larger animals by making it of suitable dimensions. The trap consists of a wire shaped to form a loop, spur, spring, and bow, with a trigger having an abutment and an extension up into the bow, the entire trap being formed of but two pieces of wire.

Messrs. Charles S. Moseley and Abraham Bitner, of Lancaster, Pa., have patented a safety pinion that moves its arbor in one direction by a spring catch of peculiar construction, and permits free movement of the pinion in the opposite direction without effect upon the arbor.

American Institute Exhibition.

The marked improvement in general business has had its effect upon the Exhibition of this Institute, which is to open on the 17th of September. Since 1870 no year has equaled the present in the demand for space, or in the superior character of the exhibits. Should this notice meet the eye of any person intending to make an exhibit, no time should be lost in applying for space. Applicants should address the General Superintendent, American Institute, New York.

THE large number of coal oil tanks and refineries struck by lightning shows some peculiar susceptibility of these structures or their contents for attracting electricity. There would seem to be a good field in this direction for scientific investigation and a remedy.

Catching Cold.

This pertinent question is just now engaging attention. There is another question which should be answered first, namely, What is cold? The old idea of a "chill" is, perhaps, nearer the truth than the modern notion of a "cold." The hypothesis would seem to be that a "cold" is something more than a cold, because, it is said, "You do not catch cold unless you are cold." The fact is there are probably as many diverse occurrences grouped and confounded under the generic title of cold-catching as diseases covered by that popular term fever, which is made to comprise every state in which the pulse is quickened and the temperature raised. By a parallel process of reasoning, "cold" ought to be limited to cases in which the phenomena are those of a "chill." When a person "catches cold," either of several morbid accidents may occur: (1) He may have such a chill of the surface as shall drive the blood in on the internal organs and hamper some weak, or disorder and influence some diseased viscus; (2) the cold may so impinge on the superficial nerves that serious disturbance of the system will ensue and a morbid state be set up; (3) the current of air which causes the cold may in fact be laden with the propagating "germs" of disease; or (4) the vitality of the organism as a whole, or of some one or more of its parts, may be so depressed by a sudden abstraction of heat that recovery may be impossible, or a severe and mischievous reaction ensue. The philosophy of prevention is obviously to preserve the natural and healthy action of the organism as a whole, and of the surface in particular, while habituating the skin to bear severe alternations of temperature by judicious exposure, and natural stimulation by pure air and clean water, and orderly habits of hygiene and health.—*Lancet*.

Immigration Statistics.

According to the records of the Commissioners of Emigration 3,772,707 aliens landed at the port of New York, from August 1, 1855, to January 1, 1879. Of these 1,521,566 gave their destination as New York, and 354,803 went to Illinois, 195,607 to Ohio, 81,955 to Iowa, 69,369 to Missouri, 51,863 to California, 47,687 to Indiana, 38,792 to Utah, 21,738 to Kansas and 19,728 to Nebraska. The destination of the remainder is unknown.

At a conference of delegates representing 200,000 English miners, held in Manchester recently, a resolution was unanimously passed in favor of emigration to the United States.

Similar action has been taken by the Amalgamated Engineers Society, whose headquarters are in London. The engineers on strike in Bradford have been urgently invited to come to this country, with promise of immediate employment and better wages than they can ever hope to get in England. It is said that some 300 Bradford engineers are prepared to emigrate, with assistance furnished by the society.

Killing Flies with Gunpowder.

The Pittsburg *Telegraph* tells how a restaurant keeper got rid of the flies that infested his place. The doors and windows were closed and a train of very fine gunpowder was laid in narrow strips over the floor, and the spaces between the strips were carefully painted with molasses. In an incredibly short time all the flies in the room seemed to be on the floor, enjoying the luxurious repast so temptingly set before them. It was but the work of an instant to fire the train: the result, when carefully weighed, was two pounds three ounces of dead flies. How many ounces of gunpowder were used is not stated.

Steam Heating in Troy.

The work of laying the pipes for the new system of heating is going on rapidly in Troy, the contractor expecting to have them all down by the middle of September. By the middle of August the company had over three hundred subscribers booked. According to the *Budget*, the estimated cost of fitting up a three story brick house with necessary piping and radiators was about \$200, and the expense of heating such house by steam, using all required, day and night, will not exceed \$20 per year.

Virginia's Oyster Trade.

The president of the Norfolk Oyster Packing Association says that 3,000,000 bushels of oysters will be taken from Virginia waters this year, and more than one third of these will be handled by the packers of Norfolk and Portsmouth. The average value of the oysters is 35 cents a bushel, making the oyster trade of Norfolk something like \$350,000 a year. The business has been built up since the war, and is steadily increasing.

It is stated that Professor Mayer, of Boston, recently put a soft-shelled potato bug larva into carbolic acid for three days, and then boxed it up and sent it to Europe for a zoological specimen. Nothing daunted by the 15 days' journey under such discouraging circumstances, when it reached the old country the bug was found able to eat potato vines as cheerfully as ever.

At a recent session of the Anthropological Society of Paris, a debate took place on the origin of the blonde race of mankind. Some of the speakers considered that the region of Turkestan was their original seat, while others—in particular Madame C. Royer—maintained that they had originated in Europe.

RECENT AGRICULTURAL INVENTIONS.

An improved cultivator, so constructed that the plows may be readily adjusted to work deeper or shallower in the ground, as may be desired, has been patented by Mr. Cager Hardgrave, of Clarksville, Ark. The invention consists in the combination of the upright rods, having collars and set screws, by which the plow beams are supported at any required height. The improvements are covered by two United States patents.

Mr. George W. Carroll, of Union City, Pa., has patented an improved horn tip for cattle, which may be secured to the horns without liability of breaking or otherwise injuring them; and it consists in wooden tips incased in metal sleeves attached to chains on which are elastic rings adapted to fit the tapering horns and yield to their growth. They are connected together between the horns by a loop so that the chains can be taken up or shortened at pleasure, to adapt them to different cattle.

Mr. Asa Newsom, of Valdosta, Ga., has patented an improvement in plows. The object of this invention is to improve the construction of the plow for which letters patent No. 199,736 were granted the same inventor, January 29, 1878. The invention consists in combining a curved slotted standard, with a plow beam secured between upper ends of standard, and provided with an extension having an eye, and bars that connect the standard and handles.

An improvement in the class of cultivators whose beams are so connected as to adapt them for lateral adjustment, and which have pivoted adjustable standards, has been patented by Mr. Columbus Stephens, of Cave Spring, Ga. The improvements relate to the construction and attachment of the braces for the standards.

Progress of Shipbuilding.

The records of the Treasury Department show a decided increase in the building of steam vessels this year. The returns for the last quarter of the fiscal year were not all in, but enough had been received to warrant an estimate of an aggregate for the year of upwards of 88,000 tons. The total tonnage of steam vessels, built the preceding year, was 81,860, and during 1877 only 47,514. A considerable increase is also probable in the number of sailing vessels, barges, and canal boats. Full reports will be submitted in October.

A very considerable impulse to this department of American industry is foreshadowed in a cable press dispatch from London, to the effect that negotiations between a syndicate of American shipbuilders and the Russian Government had culminated in a large order for American built vessels. According to the dispatch, Admiral Lessowsky, Russian Minister of Marine, had signed a contract with these American ship building firms for the construction of a number of ocean corvette cruisers, which will cost about \$17,000,000.

Tobacco Pipes in Germany.

An official inquiry into the extent of the tobacco trade in Germany has brought out some interesting statistics with regard to the trade in tobacco pipes.

The chief center of this branch of industry is Ruhla, in Thuringia. In that town and the neighboring villages the annual production for the past few years has averaged 540,000 genuine meerschaum bowls or heads, and 5,400,000 artificial or imitation meerschaum bowls. The number of polished, lacquered, and variously mounted wooden pipe heads annually produced was 4,800,000. Of the common porcelain bowls, the favorite pipes of the German peasantry, there were manufactured every year 9,600,000, and of fine clay or lava bowls, 2,700,000. Further, there has been an annual average production of 15,000,000 pipe stems or tubes, of various sizes and materials; 1,600,000 dozen of miscellaneous adjuncts, such as flexible tubes, chains, tops, tufts, etc.; 12,000 dozens of meerschaum pipe cases, 800,000 dozen mouth pieces and cigar holders of amber or horn and meerschaum wood, or coconut shell; and, finally, 15,000,000 complete pipes composed of various materials. The value of the whole is estimated at about \$5,000,000.

SOME one truthfully says that the science of mechanics draws its vitality from coal and iron. Coal emancipates iron from its crudeness and furnishes it with power as an instrument of commerce. The union of these two minerals has solved the question of production, and has rendered distribution easy. The world is embarrassed only with the difficulty of consumption. Coal fashions iron and drives the finished machine. The dirty thing is the great vehicle of civilization. Iron is an instrument; coal is a cause. Iron is an agent of industry, and coal is a master power.

Two interesting specimens of the orang-outang have been placed in the Jardin d'Acclimation, Paris, the older one having been captured with others, at Borneo, after a desperate chase, in the course of which eight natives, the French (not Barnum) say, lost their lives. The animals, according to the account given, were run into an elephant trap, thirty feet deep, and were gradually reduced by hunger to a state of weakness, when they were garroted and shut up in a cage. The oldest one measures about five feet, and is said to be the largest ever brought to Europe.

THE NICARAGUA CANAL.—Rear-Admiral Ammen states that General Grant has telegraphed his willingness to accept the presidency of an American company to construct an interoceanic canal, with a distinct preference for the Nicaragua route.