present from its mouth to the Falls of St. Anthony, about two thousand two hundred miles. Above these falls it is again navigable. The Arkansas and Red rivers emptying into it are each navigable for more than one thousand miles. The Missouri, its principal western tributary, is navigable to a point nearly four thousand miles by water from the Gulf of Mexico. Its large eastern tributaries, the Ohio, Tennessee, and Cumberland rivers give two thousand miles or so additional scope for steamers; while the total number of branches, large and small, towards its mouth, which are to a greater or less extent navigable, has been estimated at not less than fifteen hundred.

The lower plain through which the Mississippi flows, extending from the mouth of the Ohio to the Gulf, is about five hundred miles in length and of varying breadth, say from thirty to one hundred and fifty miles, including the great delta at its mouth. The delta is in all its parts nearly on a level with the water in the river when at its lowest point, and in consequence a system of dykes has been found requisite to prevent inundation. In the low water of summer the current towards the mouth of the river is extremely sluggish, an average fall of about eight inches per mile being all that is estimated for the lower plain through which it flows. It could hardly be otherwise under these circumstances that the course of the river over this plain should be very crooked, and its channels should be very changeable. Add to this the fact that the entire system embraces many tracts of sandy country and timber land and it will be easily understood how bars are constantly forming and shifting and "snags" are constantly drifting down the current to obstruct navigation.

How to relieve navigation from these embarrassments and at the same time to protect the low lands from the dangers of inundation, constitutes an intricate problem and one which will probably never be solved except by repeated experiment. The clearing up and removal of timber along the banks of the principle stream and its affluents, will gradually lessen the trouble arising from "snags," but the sediment poured into the river by the Missouri and other rivers and the periodical freshets remain. Some of the convolutions in the course of this river are so great that a distance of twenty-five to thirty miles by water only makes an air-line headway of a mile or two.

Some cuttings have been attempted to straighten the channel in such cases as the above but we believe the result has generally been that the succeeding freshets have wholly or partially filled up the channels thus formed, and the obstinate waters have either selected an entirely new bed or have returned to the old one. True these works were very imperfect in their nature and could hardly be expected to be durable; but there are doubtless difficulties to be surmounted in making permanent improvements in the Mississippi channel arising from the general instability of its banks, that are hardly appreciated by engineers who have not given special attention to the subject.

A plan has been recently laid before the Louisville Board of Trade, recommended by the New Orleans Academy of Sciences, which it is claimed meets the exigencies of the case; embracing, first, the proper direction to be given to walls or jetties for controlling the action of flowing water; and, second, a material for the construction of these walls or jetties, which can be conveniently handled, and which water cannot move or undermine. The first part of this plan depending upon the principle of reflection for the direction of currents, it is claimed can be readily applied by the exercise of proper judgment in constructing the jetties at the necessary angles to the currents intended to be controlled. In regard to the second part of the plan it was represented to the board that Manico's caisson is the best material for the construction of these jetties. These caissons are the invention of Lieut. Manico, of the Royal Marines of Great Britain, the engineer in charge of the construction of the breakwaters and other sea works of England, and are now used exclusively for such works on its coasts. Their construction and the method of placing them in position were described to the board as follows: "They are usually constructed of a latticed frame of wood or iron filled with loose stones of any kind; and for the convenience of being carried in barges, and handled with the crane, they are only one yard square. They are made sufficiently strong to bear the weight of from 1,200 to 2,000 pounds of stone, and to be craned or dumped down to form walls or obstructions upon the lines marked by the engineers for breakwaters, jetties, the foundations of lighthouses and forts, or any subaqueous works in seas or rivers. They are used exclusively in England for such purposes, and they are especially useful in all water currents, and indispensably necessary in bottoms of sand and mud, like those of our harbors and great rivers where piling and planking will not answer. Their great excellence consists not only in the convenience of their form for transportation, and handling for engineering purposes, and their cheapness, but in their stability to resist the undermining power of water. Their latticed form gives them the property of the snow shoe formed by the savage of plaited splits, and which prevents his foot from slipping or sinking in the snow; or like the knotted and webbed foot of the duck, which the Creator has formed for standing or walking on the mud and sand. They will not sink upon a sand bar and no power can drive them into it.

"The work done by the aid of these caissons is very simply and quickly performed. The lines for the jetties to protect a caving bank, or remove a bar, or shift or deepen a channel are 'staked off' by the engineer, and the barges of caissons are unloaded upon these lines and the work is done. The water completes the structure, and by its deposits makes a solid wall of the whole. No matter how they are thrown in a current, they can never be removed by the water. Every interstice between the loose stones is filled with sand and clay. Chemical action takes place in the compacted mass, and the whole becomes a conglomerate which will endure to the end of time."

In opposition to the claims of this plan may be placed the statement of General Roberts, of the U. S. A., made at the last meeting of the Connecticut Academy of Sciences, in which he attempted to show that the system of confining the flood-waters of the Mississippi river in one narrow channel by dyking, is obstructing the creative laws of delta bottoms and basins, and working the most serious evil by emptying into the Gulf of Mexico the delta-forming material that would, if the waters were left free, spread themselves over the low marshes and swamps, and in time raise them up to higher levels, by the cumulative process of delta deposit, and create cotton lands.

His plan is to introduce a system of waste weirs that should create artificial rivers and carry all the flood waters into the swamps, morasses, bayous, etc., of the Mississippi basin. He also proposes a system of engineering for the waters of the lakes, using them as reservoirs for the regulation of minimum low water navigation.

Without pretending to decide finally upon the relative merits of these schemes, we repeat that experiment alone will determine the value of either. To attempt to carry out either of them without previous trial of their individual workings would be extreme folly. It would be well, we think, for the Government to employ some engineers of established reputation to devote their time and efforts to experimental solution of this problem, and to feel the way as it were to a practical method. We do not believe the man lives who can devise in his study a system that will fulfill all the conditions of the problem, but we do not by any means on that account hold that a solution is impossible. If ever obtained, however, it will be by practical attempts upon the fickle banks themselves and not upon drawing paper.

WHAT IS FUSEL OIL?

The new York dailies, since the report of analytical chemists of the Board of Excise has been made, are asking the question, What is fusel oil? Some have also made a feeble attempt to answer the question which is thus propounded. The query has arisen from the fact that the report above alluded to states that out of thirty-two samples of Bourbon and brandy obtained from the liquor dealers of this city all but four contained fusel oil. One daily gives vent to its feelings in the following:

"Is it after all such a frightful thing? Dunglison describes it as an acrid, volatile oil, formed in the manufacture of potato brandy, and which is not easily separable from it; and another authority says it accompanies ordinary alcohol in its production from potatoes and grain. Dunglison also says that its chemical constitution is analogous to that of alcohol, and that, in small doses, it is highly stimulating—acting like narcotics in general; while, in large doses, it destroys the mucous membrane of the stomach. The same authority also designates it as 'potato oil,' 'grain oil,' 'corn spirit oil,' 'amylic alcohol,' and 'hydrated oxide of amyle.' Some medical men have considered that in the use of whisky by consumptives, fusel oil was the effective element—having the tendency to retard the processes of decay in the tissues of the lungs. But there is no question of the ruinous effects of the fusel oil liquor sold in New York."

In regard to the effects of fusel oil upon the human system we can do no better than to quote the "United States Dispensatory," which says: "Amylic alcohol (fusel oil), as shown by experiments on inferior animals, is an active irritant poison." If that is not sufficiently definite to satisfy anxious and thirsty inquirers we shall not attempt to make it more so. Of course it may be taken like other poisons diluted with water and common alcohol, as it is found in the compounds doled out by honest and conscientious rumsellers without danger of immediate death or anything more serious than "redness of eyes," temporary madness of brain, and now and then a touch of *delirium tremens*, until the coats of the stomach and the nervous system succumb to continued and prolonged attacks, and another wreck is cast upon the shores of life. But it is, nevertheless, a poison, *an active irritant poison*, upon good authority. How it gets into the liquor is of little consequence. The report says it *is* there, and we say let it alone and it won't poison you.

THE NEW FRENCH GASLIGHT.

Messrs. Ball, Black & Co. have illuminated the show windows of their splendid store in Broadway with the Bourbouze light. Its peculiar brilliance and beauty nightly attract a crowd of admiring spectators. So brilliant and pure is this light that the ordinary gaslights look like spots of sickly and ghastly yellow when placed between the eye and the pure white illumination of the Bourbouze burners. The light is as steady as the sun. The closest examination cannot detect the least tremor. We tried it with a sheet of white paper corrugated, and inclined so that portions should be thrown into shadow, thus magnifying any motion that might be imperceptible to the unaided eye, but could not detect any motion whatever. Equal parts of oxygen and common street gas are driven simultaneously upon a pencil of magnesia; this is all there is of mechanism of this wonderful light, which literally throws all other lights at all adapted to general use into the shade. In point of cost, when lights of equal intensities are used, the new light is so much cheaper that we should fear to be suspected of exaggeration should we make a statement of it. We are told that Messrs. Ball & Black's establishment is the first that has adopted the Bourbouze light on this continent. A full description of it will be found on pages 185, and 200 Vol. XVIII. of the SCIENTIFIC AMERICAN.

WE were recently shown a chain of brass, with hook and solid links, said to have been cast in a sand mold.

REMINISCENCES OF TRAVEL IN SPAIN.

NO. V.

An anonymous correspondent, who signs himself "A Spaniard" complains of some of our strictures upon Spanish manners. We can only say that whatever we have written upon this subject is not only true, but our statements are borne out by other travelers and writers who have visited Spain. The habits and customs of a people are free to be observed and commented upon by all travelers, and in the preparation of our reminiscences of Spanish travel we have had neither motive nor purpose to do the slightest injustice to the people of that afflicted country; and if some of our statements have seemed singular even to a native Spaniard, we can only account for it by the fact of his long residence in this country, where life, untrammeled by usages of hoary antiquity, appears more new, fresh, and vigorous.

There is one other phase of Spanish character which we propose to present, and in thus closing our sketches of European travel, it is with the hope that Spain, which has so grand a history, with so much undeveloped wealth, may, even though it be through revolution, once more arise to greatness and substantial prosperity.

THE GREAT NATIONAL SPORTS—A BULL FIGHT.

The national sports of a people are true indexes of their character and civilization, and it is therefore difficult to believe that Spain is the only Christianized nation in the world which tolerates the cruel and inhuman practices of bull fights and cock fights.

It is commonly said that you must not quit Spain without seeing a bull fight, the great national sport. We had read about this heroic spectacle, and being naturally averse to cruelty in every form, we entered upon the business with considerable trepidation. But after all there is nothing like seeing of what stuff the people are made in order to properly appreciate their character. We wanted to see the whole thing or nothing, and to make the affair as respectable as possible in our own eyes, we joined a party of Americans and proceeded to visit the Plaza de Toros (Place of Bulls) the evening previous to the fight, for the purpose of inspecting the pens where the animals were kept. These pens, within the inclosure, are about fifteen feet square, and are provided with galleries, where the tormentors practice the *humane* sport of spearing the bulls, in order to get them into a towering rage before they are let through the dark narrow passage way communicating with the arena. Within the building there is also a hospital, provided with apparatus and medicines, in case any of the tormentors should chance to be injured, and in order to impart to the spectacle a serio-dramatic interest and solemnity, there is also an altar, where they kneel and kiss the crucifix before engaging in their work; the effect being heightened by the presence of a priest* to administer the consolations of religion in the event of any of them being mortally wounded. A most touching and beautiful adjunct to be sure.

The next morning, being the occasion of a popular religious festival, the whole city was astir, and in the afternoon the crowd began to wend its way towards the Plaza de Toros. The building resembles an ancient coliseum, built of stone, and furnished with several tiers of stone seats, above which are inclosed boxes for the higher classes. There is also an inclosed box emblazoned with the royal arms, and appropriated to the use of the royal family. We should judge that 15,000 spectators might be accommodated with seats. The arena is surrounded by a heavy plank barrier, about six feet high, to protect the spectators, and over which the tormentors leap when hotly pursued by the infuriated beast.

The performance was announced to begin at three o'clock in the afternoon, and an armed guard of handsomely mounted men were stationed about the Plaza to preserve order. The crowd inside, consisting of men, women, and children, must have numbered ten thousand, and aside from slight manifestations of impatience, behaved very orderly. The band performed an overture and the performers entered. There were several men in costume called *picadors*, mounted upon miserable old horses, of the same class used to draw fish wagons about our streets. The *picadors* have their legs incased to ward off the thrusts of the bull; and following them was a team of three mules in fancy harness, dragging a whiffletree and chains, accompanied by *bandarillos*, who flaunt the red cloaks, also several men leading bloodhounds. We were satisfied at this point that we were not going to like the thing at all, but the ring being speedily cleared, a blast of the trumpet signalized that the beast was coming; and sure enough, in he plunged—a noble animal he was, too. After rushing wildly around, as if anxious to escape, he plunged headlong at one of the mounted *picadors*, who could offer no resistance, and in a moment he was thrown from his poor old horse, and the animal was soon beyond the need of a veterinary surgeon. After three horses had been killed, and the signal given, the red cloak flaunters had the bull to themselves. He pursued them with considerable fury for a while, but soon began to show signs of fatigue. In the meantime, by a most adroit movement, barbed arrows were thrown into his neck, two being lodged at the same moment, followed by others, until six or eight of these ugly weapons were firmly planted; the effect of which was to arouse the animal to a final desperate struggle. The next professional tormentor who enters the arena to share the honors of the occasion is the *matador*, dressed like a horseman in the circus, and whose duty it is to kill the bull—which is most skillfully done by thrusting a rapier into his neck, back of the horns, which, if well done, causes almost instant death. After this manner four bulls were tormented to death, and eleven horses were killed; each of the dead animals being dragged outside by the mules upon a keen jump,

* This information was given to me by a trustworthy local guide, who had no motive to misrepresent the facts.

there to be gazed at by an admiring crowd of dirty urchins, who could not raise money enough to get inside.

It is considered very heroic when a horse has been disemboweled if the *picador* can rally him for a ride about the arena, with his entrails protruding from the wound. This latter spectacle always excites great applause from the spectators who occupy the lower range of seats. One of the bulls, a fine orange color, from Andalusia, leaped the barrier seven times, and turned upon his pursuers with astonishing vigor. This same animal killed six horses before he fell under the sharp prick of the rapier. The last bull of the four showed no fight —he refused to attack the horses, and seemed to look imploringly around upon the people as if to say, "can it be possible that in this city of Madrid, the capital of Spain, which professes to be Christian, such awful cruelty is permitted," but he was not to be let off; the programme called for the slaughter of four bulls, therefore he must die; and four large bloodhounds were let loose upon him, when the fight became somewhat spirited, until they had fastened their fangs into his flesh, and held him fast when the *matador* terminated his life with the rapier.

The performance wound up with the introduction of four young bulls let in, in succession, with balls on their horns, to be worried by the crowd. There would have been some amusement in this but for the shocking sights which had preceded it. There is nothing whatever in this spectacle that deserves to be called a fight. It is simply a cruel method of torturing to death a few bulls—and old worn-out horses.

The whole exhibition lasted two hours and a half, and seemed to afford infinite satisfaction to the crowd of natives who were present. It was bad enough, we found, to once witness such a scene, but what shall be said of the people who cherish it as the great national sport.

It is, however, no more than just to say that the higher orders of society are beginning to look with disfavor upon bull-fighting. Such brutalizing spectacles are now encouraged chiefly by the lower classes, with the few strangers who witness them from motives of pure curiosity. Having witnessed this, the chief sport of Spain, which appears to have kept pace with the progress of the nation, we concluded to give the minor sport of cock-fighting the cold shoulder; and were glad to get out of Madrid as early as possible the next morning.

Some English writer has said that when he visited a Spanish bull fight, he felt as though the clock of time had been turned back eighteen hundred years.

OBITUARY.

Ichabod Washburn, "Deacon Washburn" as he was known, of the firm of Washburn & Moen, Worcester, Mass., died on the 30th of December last, having been identified with the manufacture of machinery in this country for nearly half a century. He was of old Puritan stock, and the writer was one of his first apprentices, when it was the style to make the youngest apprentice a member of the "master's" family. The honesty, integrity, and business capacity of Mr. Washburn are not more vividly brought to mind than his kindness to, and carefulness of all who came under his roof or were confided to his protection.

He became first established in business as one of the firm of Washburn & Goddard, successors of Capt. John Earle in Worcester, Mass., the first builder of wool carding machinery in that State.

"Deacon" Washburn is held in remembrance by many mechanics who received their first mechanical education under him, and apart from these living monuments of his fidelity to duty and his conscientiousness as an employer and the head of a family, he will be held in grateful remembrance by those who are destined to enjoy and improve by his gift to the Worcester County Institute of Industrial Science, to which he donated a brick machine shop, completely equipped, and $50,000 as working capital, and a fund of $200,000, the proceeds of which are to be used for the purposes of the institution.

In all the relations of life, employer, father, husband, friend, and citizen, he was an example worthy of imitation. His loss will be felt far beyond the limits of the city he honored by his generosity.

The Deepest Coalpit in England.

A correspondent of the London *Telegraph* has been down the great coalpit at Wigan, and writes a long account of what he saw and heard, from which we extract the following interesting details: "It is very difficult to realize the enormous value of Wigan underground. Looking at the plans of the mines which we mean to inspect to-day, we see that between the surface and the deepest point to which the sinkers have reached, there have been no fewer than twelve workable seams of coal. These include the great seam of cannel. The seams are classed in five different series. First there is the Ince series, consisting of four seams—the 'yard' seam, at a depth of eighty-four yards; the 'four feet' seam, one hundred and thirty-four yards below the surface; the 'seven-feet' seam, twenty-six yards lower; and the 'furnace' seam, at a distance of one hundred and eighty-six yards from the surface. With the exception of that which was named last, all these seams are exhausted. Below them come the Pemberton series, with a five-feet seam, at a depth of two hundred and seventy yards, and a four feet seam twenty-five yards beneath. Then there is the Wigan series, with its five feet, four feet, and nine feet seams; the first of which is four hundred and forty-five, the second four hundred and sixty-six, and the third four hundred and ninety-five yards below the surface. Lower still, at a depth of six hundred yards, is the famous cannel seam, and now the men are going even below that; they have indeed sunk the shaft to the yard seam of the Orrell series, which is six hundred and seventy-three yards below the surface; and are now, night after night, pushing their way to the fiery and dangerous Arley seam, which is here more than eight hundred yards below ground, although at Hindley they have reached the same coal at a depth of three hundred and twenty yards. There are about six hundred and fifty men employed at these mines—the Rosebridge Collieries. Just now the times are rather bad for colliers. They have not been known to be worse at any time during the last thirty years.

"After chatting awhile with the manager and his son, we made ready for a descent. We do this by doffing the clothing we ordinarily wear, and donning in its stead a very rough miner's dress. Then we (the manager's son and the writer) walk out, and, calling at the lamp room, provide ourselves with lamps, which are somewhat better that the ordinary 'Davy.'

"It is necessary to prepare the nerves for a shock. We are going down to the Cannel Mine, a depth of six hundred yards, and the big engine will throw us that distance in less than a minute. At a signal there is, as it were, a sudden withdrawal of the bottom of the cage beneath our feet, and a rapid falling through dark space; then there is as sudden a check, and we feel, not only as if we had regained our footing, but as if we were being thrust back again as rapidly as we had been before falling. Before time is allowed to analyse the sensations we have experienced, the cage touches the bottom, and we stumble out half dizzy into the eye of the pit.

"Before we leave the pit eye we have our lamps lit, and then turn to take a stroll into the workings. We are not long in reaching a little cabin, into which we step, and while sitting there we are told some particulars respecting life in the pit. When the men come to work they obtain their lamps, already lit, but unlocked, at the pit bank. Then they descend, and at the pit eye the lamps are examined and locked. They are again examined as the men enter the particular district of the mine in which they may be employed. Every day the fireman examines the clothes of each miner, to prevent the introduction of pipes and matches. The law is observed very strictly. If a man is found to have the means of striking a light he is sent before a magistrate, and either fined or imprisoned. But such a discovery is rarely made at Rosebridge. The authority of the manager is regarded, and he himself is personally respected by the men; and throughout a large colliery district these mines are noted for the admirable system of working adopted, and for the skill and wisdom engaged in their management.

"From talk about matters in general, we, still sitting in this cabin, six hundred yards below the surface of the earth, turn to what is more personal, and I learn that my guide has had his dangers and his narrow escapes, as all men must have who have to do with the getting of coal. Once he was in at an explosion, and of course ran for his life. The subtle choke damp, that palpable white mist, was swifter than himself, and floating all about him, so numbed his senses that he sat down, and felt as if lulled to a gentle, delicious sleep. Consciousness was fast passing from him, when his brother, stronger than himself, dragged him rapidly to the pit eye, and saved his life. My friend thinks that choke-damp is the easiest and nicest possible way of dying. 'There is no pain—there is simply a going to sleep, which you have neither the wish nor the power to prevent."

Exchange of Skill for Labor---China and the United States.

The Shanghai *News-Letter* suggests the outline of a plan by which China and America may enter upon a system of exchanges on a grand scale for their common benefit. The outline is given by a respected missionary in the north of China, where there is a plethora of labor and a dearth of skill; and where experience has convinced him that an exchange would be advantageous for both countries. America needs labor; China needs skill. China can furnish the first; America the second; and both would be benefited by the furnishing. He would pour into each of the Western and Southern States a million of laborers, men who by virtue of patient, industrious, and imitative habits are prepared to obey, to follow, and to execute; and would accept in return the larger brain, superior education, and stronger will which qualify Americans to originate, plan, and command. "Let them come to China," he says, "and fill the land with railroads, steamboats, and telegraphs. Let them develop her vast mines of coal, iron, gold, silver, copper, and lead. Let them light her cities with gas and supply them with water. Let them become physicians, teachers, and preachers. Let them create for her an army and navy, and command them for the good of the Chinese nation," etc., etc. By a proper distribution of brain and muscle, and a good understanding, the missionary anticipates the time when the empire and the republic will hold the destinies of the world.

Editorial Summary.

THE SOUTH AFRICAN GOLD FIELDS.—The Philadelphia *Ledger* says, the South African gold fields are to be visited by an exploring party, composed of certain well known travelers in Africa, and of assistants skilled in mining gold in California. A photographer will be attached to the party. The expedition will be absent for over a year, and will visit regions where no travelers have as yet been. Mr. Baines, one of the company, has already visited the Transval region, and describes the operations of the native goldsmiths as follows: They use, he says, a broken earthern pot for a furnace, and a small goat skin for bellows. The crucibles are made from the nests of the mason wasps, and the metal is cast into ingots five or six inches long by half an inch square. The ingots are made into bars be the use of a hammer on a small anvil, weighing three or four pounds. The natives use blowpipes made out of the section of a gun barrel.

THE NEW STATE DAM AT COHOES.—This work is rapidly progressing. It is to be fifteen feet higher than the old structure, and stands twelve feet further down the river. It is supposed the increased hight will prevent the hitherto frequent drifting over and wreck of boats during the freshets to which the Mohawk is liable. Four hundred feet of the dam are already completed and one pier. The total length will be sixteen hundred and forty feet. Its width at the bottom is eighteen feet, and at the top ten feet. Its hight varies from fourteen to twenty feet. The whole structure is of granite.

AN adaptation of the semaphore signal post to street traffic is now the subject of experiment in London, the object being to assist the police of that city in preventing the concentration of vehicles at crossings when stoppages occur. The use of the signal is to warn approaching vehicles against coming too near, and thus enabling the officers to make a diffused or general stoppage some distance from the crossing rather than the usual jam and confusion now common in such cases. Something of the kind is also greatly needed in New York.

THE *European Mail* says the little Prince Theodore has got out of the channel of gossip, and few know where he is and how he is being brought up. The young Abyssinian is at school at Bonchurch, in the Isle of Wight, and turns out with the boys—a very dark speck on their line of white faces. The expression of the lad's face is good, and his eyes are such as might serve for a chapter on "dark orbs" for anyone in writing a novel. He is under the charge of Captain Speedy, who is bringing him up kindly and carefully.

THE largest kitchen in the world is that of Liebig's Extract of Meat Company's establishment at Fray Bentos, on the river Uruguay, South America. The building covers an area of 20,000 square feet. In one hall there are four meat cutters, which can dispose of 200 bullocks each per hour. There are 12 digesters in which the meat is boiled by steam. They can hold altogether 144,000 pounds of beef. About 80 oxen per hour are actually slaughtered for this immense establishment.

PARADE OF THE NEW YORK LETTER CARRIERS.—On the morning of the 30th December, the letter carriers of New York city, arrayed in the new uniform of the department, paraded through the streets to the number of about two hundred. Our rural friends may form some idea of the extent of the postoffice business here when it is known that it takes the entire time of over two hundred men to deliver the mails, exclusive of the large amount of matter taken from the boxes.

DISASTROUS FIRE IN LYNN.—The thriving and busy city of Lynn, Mass., has received a severe blow in the disastrous fire on Christmas night. It was the most serious conflagration ever experienced by that town, and although it will not seriously affect its chief industry, the manufacture of boots and shoes, it throws 600 hands out of employment in the dead of winter, and inflicts severe loss upon many prominent business men.

THE steam roller for leveling and smoothing newly made or recently repaired roads just introduced in Liverpool, seemed at first to be a great success. It seems, however, that its use has resulted in serious injury to the network of gas and water pipes underlying the streets, and its weight will have to be reduced or its use discontinued.

A GERMAN savant has put forth a singular and novel theory to account for the decay of the trees in the gardens and promenades of Berlin as well as in other large European cities. He attributes this decay to the tremulous motion of the ground, which prevents the perfect adherence of the soil to the roots necessary to the absorption of nourishing juices.

THE whole of the capital required for the laying of the new French Atlantic cable has been subscribed and the first instalments paid in. Four hundred and sixty miles of cable are completed and the work is progressing rapidly. The Great Eastern is fitted out and was to commence receiving the cable in the earlier part of January.

PROF. MARSH, of Yale College, is said to have discovered in the tertiary deposits of Nebraska the minutest fossil horse yet obtained. It is only two two feet high, although full grown, as the character of the bones fully indicates. This makes the seventeenth species of fossil horse discovered on this continent.

THE improvement made in the art of watchmaking, and the present approach to perfection are shown by the fact that in 1862 the average deviation of the Neufchatel chronometer was 1·61 seconds per day; but one was recently finished and tested which gave only ·164 of a second variation in twenty-four hours.

THE longest artillery range on record, namely, 10,300 yards, was lately attained at Shoeburyness by Mr. Whitworth's 9-inch muzzle loader gun of 14 tuns firing a shot of 250 lbs. with a charge of 50 lbs. This range is 225 yards over that of the 7-inch Lynall Thomas gun, which in 1861 ranged 10,075 yards.

The American sewing machine has crossed the Alps, and has made its appearance in the chief cities of Italy. It is reported that there is a lively competition going on among the dealers in Florence. No other people in Europe more need the introduction of labor-saving machinery than the Italians.

IT is stated that the Mont Cenis Tunnel lacks but little more than two miles of completion.