

IMPROVED GATE.

The annexed engraving shows an improved gate recently patented by Mr. W. H. Marshall, of Oxford, Miss. This gate is intended to resist the various causes which tend to throw it out of adjustment, so that the latch will always work properly no matter if the distance between the gate and latch post varies or if the gate or posts get out of position.

The stile, A, at the swinging end of the gate, is recessed to receive the catch, D, projecting from the gate post, E. The catch, D, consists of a vertical plate provided with a horizontal flange upon which there is a T-headed rib for receiving the latch, F; at the upper side of the recess in the stile, A. This latch slides vertically in a guide, J, attached to the stile, and has a curved recess, G, for receiving the head of the catch, D. The latch, F, has inclined arms, H (Fig. 3), which are engaged by the catch, D, as the gate is closed, and raise the latch so as to bring its recess, G, on the head of the catch. The latch is formed so as to engage the T-head of the catch when an attempt is made by hogs or cattle to open the gate, so as to prevent the gate from being raised and thrown off the hinges. The hinge stile of the gate is tapered from bottom to top, and to it is secured a tapering filling piece, L, that fills the space between the stile and the hinge post, M, and prevents the passage of chickens and other small animals.

The shank of the upper hinge extends through the tapering stile, and is provided with a wing nut by means of which the shank may be drawn in or let out to compensate for any sag in the gate or inclination of the post. The construction of the lower hinge is clearly shown in Fig. 4.

These improvements seem to avoid the troublesome features of ordinary gates and render the gate always operative.

The Teeth of the Yakuts.

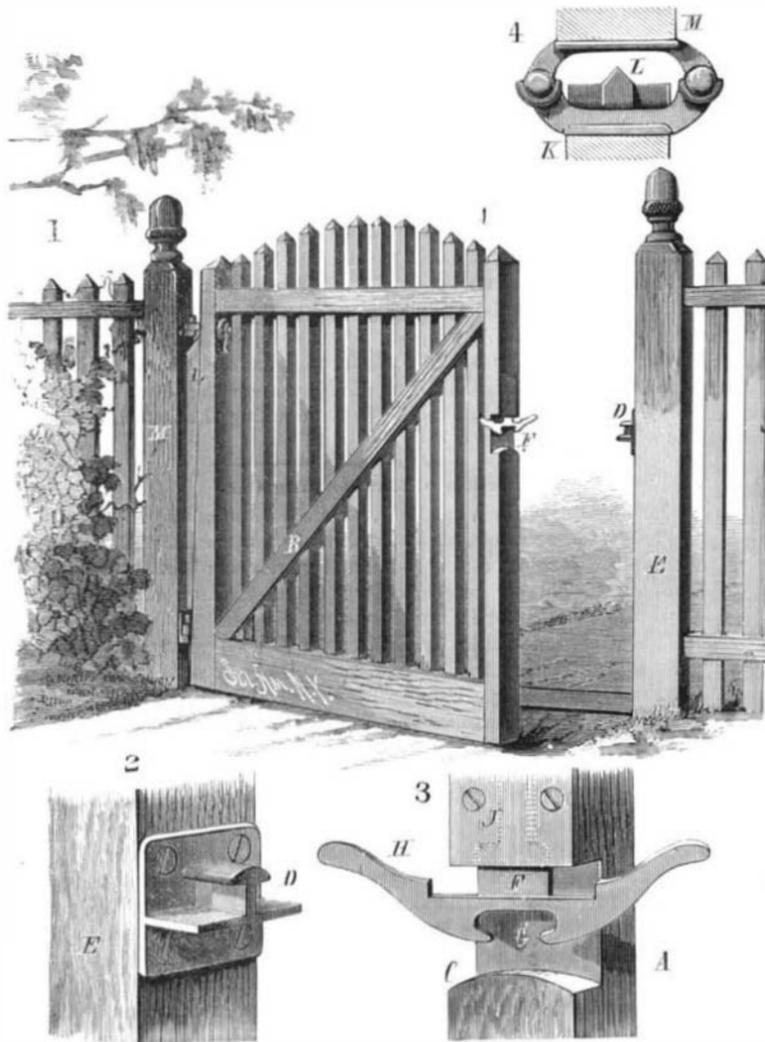
The *Herald* correspondent with the party in search of the lost crew of the *Jeannette* finds among the natives of northern Siberia the "most beautiful teeth in all the wide world." He says:

"Three hundred versts from Yakutsk I have seen old men of sixty and seventy with sets of teeth small and pearly white and polished and healthy as those of the handsomest American girl of sixteen. Decay and suffering and unsightliness and loss are actually unknown. A physician of Yakutsk tells me that he believes the reason of this phenomenon is to be found in the habits and the kind of food eaten by the natives, as well as to a certain care taken by them from childhood up. In the first place, the Yakuts do not touch sugar in any form, for the simple reason that they cannot afford to purchase it. Secondly, they are in the habit of drinking daily large quantities of fermented sour milk, summer and winter, which is antiscorbutic and is very beneficial in preserving the teeth. And lastly, they have the habit of chewing a preparation of the resin of the fir tree, a piece of which, tasting like tar, they masticate after every meal, in order specially to clean the teeth and gums of particles of food that may remain after meals. The gum or resin is prepared and sold by all apothecaries in Siberia, and is much used by Russian ladies. The fermented milk is said to be a not very savory drink. First, the milk is cooked and then put into a large vase-shaped utensil made of frozen cows' dung, in which it is allowed to ferment until the winter, when it is broken up into blocks and preserved for use in the cellars all the year round."

GAS EXHAUSTER.

We illustrate one of a pair of exhausters manufactured by Messrs. W. H. Allen & Co., London. These exhausters are an improvement on what is known as Beale's patent, a machine which has been more used in gasworks than any other for exhausting and forcing gas. The improvements of Messrs. Allen consist in making the segments of cast steel with an internal face, so that the gas is prevented from entering the segment—as in the old form—and escape in this direction is thus avoided. By increasing the size of these segments and decreasing their weight, so that the centrifugal force does not come into play, a considerable amount of friction is dispensed with, and scarcely any heat is generated. Some machines of the old form have been known to increase the heat of the gas 10° or 12° in passing through the exhausters only; but in this new form the heat is increased very little. Another im-

provement consists in making the slide pins of extra large size, and so reducing the wear on these important parts. The exhauster, as now made by Messrs. Allen, is nearly balanced in every way, so that there is an equal strain throughout. The exhauster is combined with, and driven by, a direct acting steam engine, with double crank and fly wheel on the opposite side. The engine is fitted with a very simple, yet effective, single slide expansion valve, and altogether the arrangement is very neat and compact, and as the whole of the working parts, including crank, connecting rod, and crosshead, with their bolts and

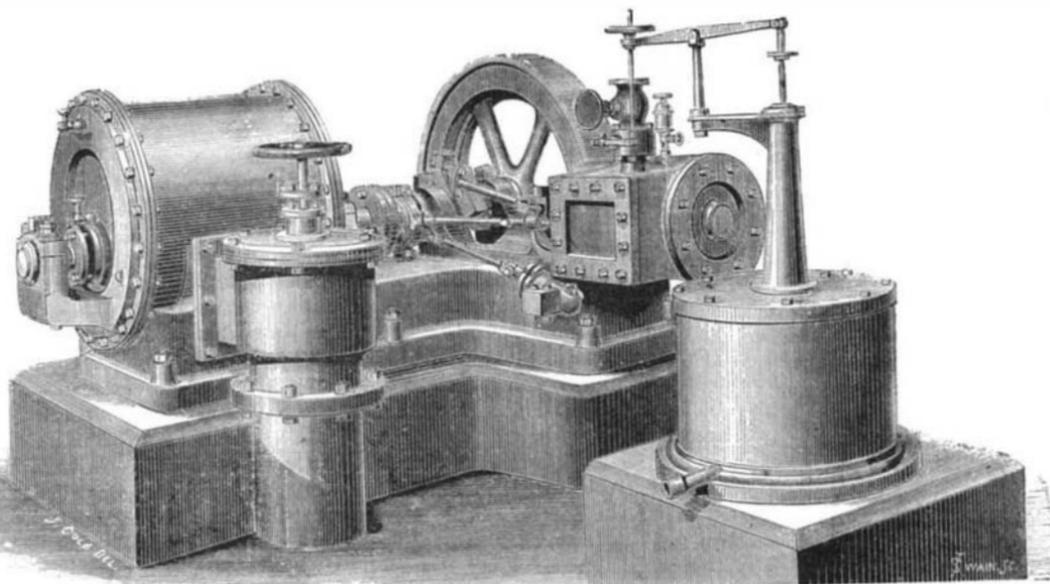


MARSHALL'S IMPROVED GATE

nuts, are made of steel, the lightness of their parts, with the beauty of workmanship, gives them an excellent appearance. The engines are regulated by a hydraulic governor directly on the engine, as shown. These exhausters are capable of passing 50,000 cubic feet per hour against a pressure of 74 in. of water.—*The Engineer.*

The Candle Tree.

The tallow tree, or, as it is sometimes called, the "candle tree," a native of China, which for a century or more has



IMPROVED GAS EXHAUSTER

been used as a popular shade tree in the principal cities of the Southern States along the coast, is now creating some attention in California, as it is thought that tallow can be obtained from these trees cheaper than the illuminating oils at present used in lighthouses and elsewhere. In its native country the seeds and pods of the tree are bruised and then boiled, causing a kind of tallow to rise to the surface, which is much used in the manufacture of candles. The colored candles used in the decorations of our Christmas trees are said to be made from this wax.

Skin Grafting from Rabbits.

Dr. Lamallere, of Paris, several months ago, performed an operation of skin grafting, employing grafts obtained from two different sources, a human being and a rabbit, those from the latter evincing a superior amount of vitality. The patient, a man thirty-seven years old, had suffered for six years from a varicose ulcer of the left thigh, which resisted every form of treatment. The ulcer was 14 centimeters long and 8 deep. At the request of the patient, Dr. Lamallere determined upon skin grafting, for which he obtained six grafts from the abdomen of a rabbit, it having been previously shaved, and two from the forearm of a man. These having been placed in position, a Lister dressing was applied. After the lapse of eight days this was removed, and it was found that those furnished by the rabbit had become adherent, and that new skin was forming rapidly in their immediate neighborhood. On the other hand, the two which had been taken from the man had not adhered. The dressing was continued eight days longer. When it was removed an islet of skin, 10 centimeters long and 7 wide, was seen to have established itself upon the center of the ulcer. The dressing was again reapplied, and maintained *in situ* for eight days, at the completion of which it was taken off, and it was found that the sore had completely cicatrized. Two months later the patient was again seen, the healing process was progressing favorably, and the newly formed skin showed no trace of its origin—*Dr. E. C. Vidal, in Monthly Review of Medicine.*

A Dangerous Cigar Lighter.

Street hawkers have lately taken to selling a "magic cigar lighter," which is calculated to do much mischief. As every student knows, the affinity of sodium for oxygen is so great that it will take the coveted element from water with such rapidity as to cause it to burst into flame. The new lighter is a thin strip of sodium, a fragment of which when placed on the end of a cigar and touched with water, burned with great vehemence.

Few of those who buy the little vials of lighters are aware what vials of wrath they may turn out to be if unskillfully handled. The burning sodium will make an ugly wound if it comes in contact with the skin, which is likely to happen from the sputtering way it has. A sweaty finger is enough to set the stuff ablaze, or a sweaty pocket, should the cork of the bottle chance to come out. As the lighters are bought chiefly by the ignorant, who are taken by the seeming miracle of producing fire by the direct action of water, it is a wonder that no serious accidents with them have been reported. The traffic is not one to be encouraged.

A New Baking Powder.

V. Krehon, in Austria, has invented a baking powder which is made of 180 parts of crude alum, 75 parts of bicarbonate of soda, and 50 parts of the "less basic" phosphate of lime. This last ingredient, which is denominated "less basic phosphate," is the product obtained by pouring ten per cent hydrochloric acid on an equal weight of bone meal burnt white. On pouring water upon this baking powder carbonic acid is formed and sulphate of soda and potash, while the alumina separates. The alum is completely decomposed, so that the inventor considers it harmless. One ounce is sufficient for 1½ pounds of flour.

Sun Spots and Great Storms.

Professor Couch, of Des Moines, Iowa, advises those living in exposed places to provide cellars or caves of refuge for shelter when the sky looks threatening in the southwest. He says that 1882 is the maximum year of the 11-1 years sun spot period, and also the maximum year of two other periods—a long

and very long period; and the same degree of energy that gives the maximum sun-spot period also gives the American continent maximum rainfall and a marked degree of force in the effects of its storms; and the end is not yet.

To starch collars, cuffs, etc., so that they will be stiff and glossy as those bought at furnishing stores, add to one quart of the well boiled (corn) starch three ounces of water glass, one ounce of gum arabic, and two ounces of loaf sugar. Use a polishing iron.

Railway Car Telegraph.

The method of train telegraphing invented by Captain C. W. Williams, U.S.A., was recently given a practical trial on the Atlanta and Charlotte Air Line. The invention is described by the *Atlanta Constitution*, of June 21, as follows:

"A line of telegraph wire, broken at suitable intervals, is laid within or beside the railway track, and the disconnected ends of the wire are connected with key blocks placed upon the cross ties, thus forming a continuous telegraph line or circuit over the entire length of the track operated upon. The key blocks have exposed upon their surface two metallic rollers which form part of the circuit, but which by depression disconnect and break the circuit. In other words, while the rollers of the key blocks are in their normal position there is a complete circuit over the whole line; but if any one of them be depressed the circuit at that point is broken. The second part of the device consists of an electric key board or shoe suspended beneath a car at such height that as the car passes over the track it will rest upon and depress the rollers of the key blocks. This shoe also has upon it metal strips of such length that as the car moves along they shall at all times touch upon the rollers of one or the other of the blocks, and is also connected by wires with a telegraph instrument in the cars.

"The *modus operandi* is then as follows: The shoe, touching upon the rollers and depressing them, breaks the main line circuit, which then flows into one of the metal strips of the shoe, thence over one of the wires into the car, through the instrument down the second wire to the second metal shoe plate, from there to the second roller, and then on again down the main line. It will thus be seen that there is no actual breaking of the electric circuit, but merely a deflection of the current through the telegraph car with precisely the same effect as a current is passed through a telegraph office. The results of such an operation are manifest. The car upon the track becomes a telegraph office, may receive or send messages, and may communicate with other trains or outside telegraph offices. Thus the train dispatcher of a railway may be in constant communication with every train upon his road—ready to move them at any instant. Trains may communicate with each other and learn at any instant of time the exact position each occupies."

The test is described by the same paper as follows: "At the trial on Monday everything was in perfect condition. On arrival of the afternoon train from Atlanta a car was found at the junction with the shoe attachment as above described, and a locomotive with steam up ready to take the party, which consisted of representatives of the press and several railroad officials; among the latter Mr. Williams, supervisor of track of the Richmond and Danville Railroad; Mr. Payne, master bridge builder; Mr. Harralson, operator at Toccoa. The telegraph line was found almost a quarter of a mile from the junction. The key blocks were laid at intervals of about 40 feet on wires stretched between. The distance covered was about 200 yards.

"After examining the blocks the party returned to the car and steamed up and down the track. It was found that as the slide struck the first block the instrument in the car clicked its announcement of going into circuit, and thus remained steadily with its lever drawn down to the magnet, only losing circuit as the slide left the last block, thus establishing the continuity of the circuit. The next test applied was the sending of a message from the moving train. A full head of steam was put on, and a run back for a start taken, so that as the blocks were reached a speed of fully twenty-five miles an hour was attained. Click went the instrument, and then Mr. Harralson, without interruption, rattled off a message, which was communicated to a second instrument without the car. Next the test was applied of a train slow in motion, and then of a train standing still, all of which were equally satisfactory, and at last a message was sent into the car in motion from the instrument upon the ground. This was the crowning test, and its successful result met with hearty applause from the onlookers.

"It was the opinion of all who witnessed the test that the complete practicability of the invention was proven. Mr. Harralson said his instrument was as fully under his control while the train was moving as though he had it in his office. Mr. Williams, track supervisor, was satisfied that it was a practicable device and that it would present no serious impediment in track-laying, ballasting, or repairing."

The Teasel Industry.

A correspondent of the *Gardener's Monthly* states that the farmers of the towns of Marcellus and Skaneateles, Onondaga county, N. Y., are quite extensively engaged in the cultivation of the teasel, and that they are annually realizing on the product half a million of dollars. The plant was introduced into that section about fifty years ago by Dr. John Snook. His attempts at cultivation were successful from the start, but such was the prejudice at that epoch against everything American that he was obliged to sell his production as French growth, and it was not until twenty years ago that the American teasel was admitted to be the best grown in the world.

The seed is sown about the beginning of May, and about one month afterward is given its first hoeing. In another two weeks it is ready to thin out, which is done by hand, one plant being left every six inches in the row, and the rows three feet apart. In August the ground is again hoed for the last time in the first season. The second season the horse cultivator is kept at work pretty steadily for two weeks, and the plants that were formed from the seed the

first year, throw up a main stalk the second year, and when about two feet high, a leaf makes its appearance, which gradually forms a cup around the stalk; from the base of this other branches arise, and these in turn repeat the process, until the plant has from forty to fifty stalks. On the end of each stalk is a teasel. The cups act as reservoirs, with a capacity of from three to five quarts of water, and thus keep the plant supplied from one rain storm to another. The main stalk teasel is called the "King," and is the male part of the plant. It blossoms first, beginning at its apex and gradually going toward the base, and while this is in operation, it sheds a fine pollen over the other teasels, called queens, by which they are impregnated. They all blossom with a white flower, and as soon as this drops, they are fit to cut. When taken from the fields they are placed in drying sheds built for the purpose, and cured. When they are ready for market, they are bought by dealers, who take them into their factories, and prepare them for the woolen mills. The preparation consists in clipping off, by hand, the beard that grows at the base of the teasels, cutting the stems to about three inches in length, sorting them into four different qualities, into eight different lengths, and gauging them by machinery into thirty-six different diameters. The different lengths, diameters, and qualities are packed systematically in separate boxes, measuring $3\frac{1}{2} \times 3\frac{1}{2} \times 5$ feet. There are seven different houses engaged in shipping, employing from twenty to fifty hands each, throughout the year, with trade extending from San Jose, California, on the West, to St. Petersburg, Russia, on the East, including the Canadas and Mexico.

The Origin of the Sleeping Car.

Mr. W. Barnet Le Van, M. E., of Philadelphia, says: "From all accounts, no doubt, Napoleon I. used, in 1815, the first 'sleeping, dining room, and parlor car' that ever was built. This car, or chariot, was taken at Waterloo, and was presented to the Prince Regent of England, by whom it was afterward sold to Mr. Bullock for \$12,500. It eventually found its way to Madame Tussaud's wax-work exhibition, London, where it may still be seen. This very curious and convenient chariot of the First Emperor was built by Symons, of Brussels, for the Russian campaign, and is adapted for the various purposes of a pantry and a kitchen, for it has places for holding and preparing refreshments, which, by the aid of a lamp, could be heated in the carriage. It served also for a bedroom, a dressing-room, an office, etc. The seat is divided into two by a partition about six inches high. The exterior of this ingenious vehicle is in the form and dimensions of our large coaches, except that it has a projection in front of about two feet, the right-hand half of which is open to the inside to receive the feet, thus forming a bed, while the left-hand half contained a store of various useful things.

"Beyond the projection in front, and nearer to the horses, was the seat for the coachman, ingeniously contrived so as to prevent the driver from viewing the interior of the carriage, and yet so placed as to afford those within a clear sight of the horses and of the surrounding country. Beneath this seat is a receptacle for a box, about $2\frac{1}{2}$ feet in length and 4 inches deep, containing a bedstead of polished steel, which could be fitted up in a couple of minutes. Over the front windows is a roller blind of strong painted canvas, which, when pulled out, excluded rain, while it admitted air. (This might be an advantageous appendage to our present car windows as well as carriages.) On the ceiling of the carriage is a network for carrying small traveling requisites. In a recess there was a secretaire, 10 by 18 inches, which contained nearly a hundred articles presented to Napoleon I. by Marie Louise, under whose care it was fitted up with every luxury and convenience that could be imagined. It contained besides the usual requisites for a dressing box, most of which were of solid gold, a magnificent breakfast service, with plates, candlesticks, knives, forks, spoons, a spirit lamp for making breakfast in the carriage, gold case for Napoleon's gold wash-hand basin, a number of essence bottles, perfumes, and an almost infinite variety of minute articles, down to pins, needles, thread, and silk. Each of these articles were fitted into recesses most ingeniously contrived, and made in the solid wood, in which they were packed close together, and many one within the other, in such a narrow space that, on seeing them arranged, it appeared impossible for them ever to be put into so small a compass. At the bottom of his toilet box, in divided recesses, were 2,000 gold Napoleons (\$7,700); on the top of it were writing materials, a looking-glass, combs, etc., a liquor case which had two bottles, one of Malaga wine, the other of rum; a silver sandwich box, containing a plate, knives, spoons, pepper and salt boxes, mustard pot, decanter, glasses, etc.; a wardrobe, writing desk, maps, telescopes, arms, etc.; a large silver chronometer, by which the watches of the army were regulated; two merino mattresses, a green velvet traveling cap, also a diamond head dress (tiara), hat, sword, uniform, and an imperial mantle, etc."

Gumption.

Mr. Edward Atkinson, of Boston, recently addressed the members of the Golden Branch Society, of Phillips Exeter Academy, upon "What Advantage Does an American Boy Possess?" Mr. Atkinson urged that the young men who are soon to become the workers and controllers in the business of life should be careful not to become one-sided, and not to lose the "gumption" which every Yankee boy ought to possess, and which does not form a part of the

curriculum of the school or college, but is developed or lost in that part of the process of education which is outside the books and independent of the teacher. Gumption is that power of applying the work of the hand and the brain together under the quick application of the will, which makes a boy or man ready for any emergency, and enables him to decide at a glance, or with a single thought, the right way of doing something. In the old time, although the organization of the schools was not as perfect as it is to-day, and although the teachers were perhaps not as competent as those of modern time, while the variety of instruction was far less, there was a no less number of able and capable men among the graduates of schools and colleges in proportion to the whole number of pupils than there is to-day. The necessity which was imposed on the rich and poor alike to do some part of the work of life with their own hands, while they were attempting to develop their mental powers, worked in the direction of that readiness and versatility which we call gumption. It is obvious to men who have been engaged from very early years in the active work of life, and have been charged with the duty of selecting men to fill important places, that the number of school or college graduates who have been adequately prepared to apply their instruction to immediate use constitutes a painfully small proportion of the whole number. It may be admitted that the only true result of school and college training is to enable a young man to know when and how to begin the real education which must form part of his life, and which will not end except with life, but it ought not to happen that the method of preparation is so ill-advised that it disqualifies the graduate in a measure for the work which he must do. Mr. Atkinson advocated for boys and young men in school and college an organized system of sports as a means of developing manual dexterity, urging the development of hand and brain together. His address throughout was an argument in favor of students endeavoring to acquire not only that knowledge that will enable them to design, but the gumption which facilitates the ready application of knowledge to the execution of design in whatever work may demand their attention and effort.

Egyptian Antiquities.

At the last meeting of the session of the Society of Biblical Archæology, Mr. Lund read a paper identifying Joseph's Pharaoh, under whom the seven years' famine took place, with Amenhotep IV., the disk-worshipping zealot and reformer, at the close of the Eighteenth Dynasty. In speaking to the paper, Mr. Villiers Stuart, M.P., exhibited a large colored drawing, 3 feet by 2 feet, of the remarkable funeral canopy lately discovered near Thebes. Some fragments of the original were also produced. He stated that Queen Isi-em-Kheb, in whose honor the canopy had been made, was a contemporary of Solomon, being mother-in-law to Shishak, who took Jerusalem on Solomon's death. He further exhibited original casts from the bass-reliefs of the tomb discovered and excavated by himself at Thebes. The casts represented the heads of Amenhotep IV. and Khuenaten, which respectively occur on the opposite sides of the tomb façade. Mr. Villiers Stuart pointed out that there could not well be a greater contrast between the two heads, although up to the present time Egyptologists had been of one mind in thinking that the two royal names, Amenhotep and Khuenaten, were but the earlier and later names adopted by the disk-worshipping Pharaoh. But in this tomb Amenhotep was remarkably stout and burly, while Khuenaten was a lean, effeminate-looking man, just as he is represented in the well-known Tel-el-Amarna bass-reliefs. Mr. Villiers Stuart pointed out what he deemed a fatal objection to Mr. Lund's identification. The Bible told us that from Joseph's death to the Exodus the Children of Israel increased from 70 to 1,000,000, and Mr. Villiers Stuart remarked that the 430 years assigned by St. Paul to the Egyptian sojourn would be none too much to allow for that increase, and would just correspond to the interval between Amasis, the founder of the Eighteenth Dynasty, and Meneptha, in whose reign the Egyptian chronieler Manetho dated the Exodus.

Tree Burial in New Zealand.

The recent fall of an enormous puketea tree near Opatiki, New Zealand, disclosed the fact that the hollow interior from the roots to the first fork, about forty-five feet from the ground, had been filled with human bodies. A confused heap of skeletons burst out of the butt of the tree when it fell. A local paper says: "A more extraordinary sight than this monarch of the forest lying prone and discharging a perfect hecatomb of human skeletons can scarcely be conceived. Some are nearly perfect, while others are mixed up in a chaotic mass of heads, hands, feet, and arms, indiscriminately. All the Maoris here seem to have been quite unaware of this natural charnel house, and declare that it must have happened long before their or their fathers' time. Indeed, the appearance of the tree fully justified the supposition that it must have been some hundreds of years since this novel family vault was filled with its ghastly occupants."

A WIRE fence, running from Indian Territory west across the Texas Panhandle, and 35 miles into New Mexico, is projected and largely under contract. Its course will be along the line of the Canadian River, and its purpose is to stop the drift of the northern cattle. The fence will be over 200 miles long.