descent was uneventful, unless I may add that the temperature as we rested for a few moments proved to be quite cool, so cool in fact that coats were longed for. This was at an altitude of 2,000 feet, half-way up the volcano.

On reaching the shores near our starting point we find our boat in waiting, with the native crew most anxious to leave, and we ourselves possessed of a pleasurable feeling that we were again in a comparatively safe place. Safe only by comparison with other places within the range of Pelée's activity (a circle of 10 miles in diameter); for while off this very point in our frail craft a few days later we were so fortunate as not only to see one of Pelée's most important eruptions, that of July 9, but to escape unhurt. We had just returned from another exploring expedition of the lower slopes, and of St. Pierre, when the rumbling and hissing seemed louder than usual. The cauliflower clouds, so peculiar to and characteristic of Pelée, suddenly became darker in color, and above all arose the much dreaded "black smoke," which seemed to pour over the sides of the volcano, then form itself into a great, huge mass which rolled with a circular motion down Pelée's slope toward St. Pierre, spreading itself out more and more, and coming for miles out over the Caribbean Sea, enveloping everything in darkness, covering all with the gray dust, ashes and pumice stone. Our crew seemed to think it necessary to spend their time on their knees and pray, and we were thus forced to use the oars to the utmost of our strength to bring our craft farther on down toward Carbet, for we knew that the bluff south of St. Pierre has thus far warded off the deadly blast, thus leaving a place of refuge, perhaps one-half mile off shore. This eruption lasted from 6 P. M. until 10:30 P. M. Having witnessed this and other eruptions of Pelée I am inclined to believe that the destructive forces consisted of superheated steam, hot pumice and a blast of tornadic force, which swept everything before it. Add to this the electric disturbances, which at times were so vivid as to quite resemble shooting flames, and the peculiar feature that the electric disturbances were much more noticeable at the water level.

I am satisfied that St. Pierre and its people were slain by superheated steam, laden down with an almost incalculable weight of red-hot sand, stone and pumice and traveling with a circular motion, at hurricane speed. After this blast had passed over St. Pierre it carried the heroic-sized statue of the Virgin, which stood on a bluff to the south, fifty-two feet from its base, and then overturned and tore from their carriages huge modern cannon, which stood in the fort still farther to the south. Daylight next morning revealed a scene of utter destruction. In every direction from Pelée's crater great rivers of hot sand and mud were tearing and roaring down its sides, while steam was issuing from every crevice. St. Pierre was again covered with ashes, and the foliage between St. Pierre and Fort de France was covered with a gray mantle.

To witness such an eruption is an experience never to be forgotten. I would not have missed it for much in this world. As to the future, no man, scientist, or layman, can predict just what Pelée will do. "Stay away at least for a time" is the only safe advice.

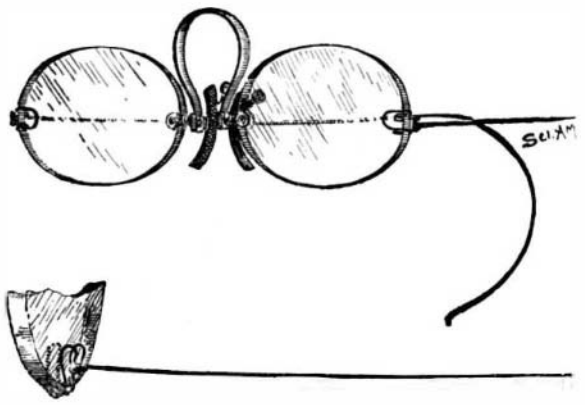
Much has been done by scientific men, much has been learned as a result of Pelée's later eruptions. But much more remains unanswered.

Now just a few words more as to my own observations. One of Pelée's big eruptions at night, as witnessed at a distance of eleven miles, was quite as awe-inspiring, even more weird and uncanny than the eruptions I witnessed at close range. The skies in the direction of Pelée become impenetrably inky black. This black mass moves upward and toward you. Suddenly all over this black space appear myriads of lights, just like incandescent electric lights; now they glow, now all is dark. There is no perceptible motion to these lights. But suddenly they all move in one direction, then in another. Now up, now down; now east, now west. Then just as you think you have discovered their line of motion they suddenly dart in every conceivable direction. You see everywhere: now sharp, zigzag flashes, now circular, like myriads of monster pin wheels; now all have a spiral motion, then of a sudden all is dark again, and you think the worst is over. But no, they appear again; are much more active and much nearer; the blackness now extends from the horizon in the north quite over your head; in a few minutes more it has spread out like a huge umbrella, quite to the southern horizon, completely shutting out all sky. But lo, and behold, of a sudden the scintillating lights and flashes appear again, and under that black pall, now so completely surrounding us, are seen all of nature's clouds that before the eruption were visible by moonlight, placidly floating by and all brilliantly illuminated by the electric display far above. In a short time dust falls upon us, and then stones, the size of walnuts. It was a majestic scene that will live as long as memory endures.

Patent Department

SOME RECENTLY PATENTED NOVELTIES.

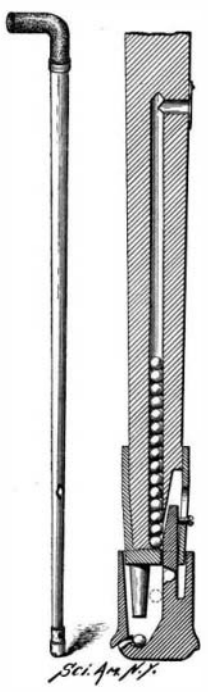
TEMPLE ATTACHMENTS FOR EYEGLASSES.—Spectacles, though not so stylish and neat in appearance as eyeglasses, are nevertheless greatly used because they can be so much more securely held in place. Occasionally a man carries a pair of each style,



TEMPLE ATTACHMENT FOR EYEGLASSES.

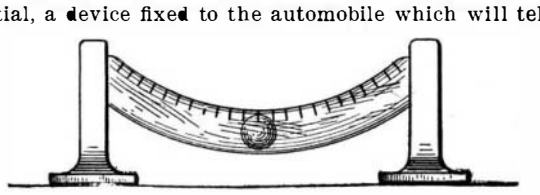
using the spectacles only whenever his duties or pleasures do not permit of the convenient use of eyeglasses. This, however, is a great annoyance, and is quite expensive where high-priced lenses are worn. Our illustration shows a much cheaper method of adapting one's eyeglasses to varied requirements. A pair of temple pieces are provided which are adapted to be clamped to the lenses of the eyeglasses, thus converting them into spectacles. These attachments are very simple, and can be cheaply made, so that if lost they can be replaced at but slight expense. By their use the glasses will be firmly held, no matter how violent the exercise or how warm the weather. A patent for this attachment has recently been granted to Mr. E. L. Lembke, of New York city.

MAGAZINE TORPEDO-CANE.—A simple amusement for children is provided by the invention of Mr. John H. Fox, of Fostoria, Ohio. The device comprises a cane having a hollow bore which forms a magazine for storing a number of torpedoes. On the end of this cane is a selector for feeding a single torpedo at a time from the magazine, and a detonator for exploding the torpedoes as they are fed out. The detonator consists of a pin formed on the bottom of a sleeve ferrule which is fastened to the end of the cane and closes the lower end of the magazine. A mortar embraces this ferrule and allows it a limited vertical motion therein. The mortar is provided with an arm which passes up into the bottom of the cane and forms a wall for the lower end of the torpedo magazine. In this arm is a recess so located that the lowest torpedo in the magazine will be forced by gravity therein when the cane is in its lowest position. As the cane is raised, the mortar remains stationary and the torpedo rests in the recess until the lower end of the ferrule has been cleared, when it drops by gravity into the firing chamber. On the next downward stroke of the cane, the detonator pin explodes this torpedo and at the same time the next lowest torpedo in the magazine drops into the recess of the selector arm; thus the torpedoes may be rapidly and successively delivered to the firing chamber and exploded.



MAGAZINE TORPEDO-CANE.

IMPROVED GRADOMETER.—While not absolutely essential, a device fixed to the automobile which will tell



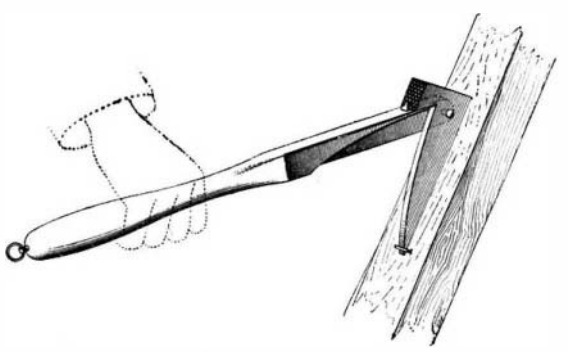
AN AUTOMOBILE GRADOMETER.

at a glance the per cent of a grade being climbed is a great source of satisfaction. There are a number of gradometers on the market, but most of them are built on the lines of the spirit level, and the little bubble is so sensitive to every movement of the vehicle and its movements so convulsive that it can hardly be seen as the carriage moves along. In order to meet the shortcomings of the others an improvement has been designed by J. H. Bullard, of Springfield, Mass. It consists of a curved glass tube fixed rigidly in a frame, which is to be fastened to some convenient surface of the vehicle. The lowest part of the tube is in the center, and before the tube is sealed a metal ball, having a diameter nearly that of the inside of the tube, is placed therein and the tube is then filled with some non-freezing liquid such as alcohol. The ball will, of course, seek the lowest point, and in doing so will register the grade of the hill being negotiated. While the action of the ball in finding the lowest point is not at all tardy, the resisting action of the liquid which it must displace as it moves about prevents it from being wildly agitated back and forth.

THERMOSTATIC FIRE-ALARM.—In a recent number of the SCIENTIFIC AMERICAN we described a thermostatic fire-alarm, in which the gong was rung by electricity. The inventor, H. C. Vierkaut, of Tarrytown, N. Y., has invented another thermostatic fire-alarm which is entirely mechanical in its operation. The alarm consists of a base, on which is mounted a spring-actuated train of gearing, the winding shaft of which is threaded to receive the gong. The bell clapper is vibrated by an escape wheel suitably connected with the gearing. When the temperature in the room rises to the danger point, the liquid in the thermostat expands and lifts a plunger which, through the medium of a bell-crank lever, forces in a pin at the back of the alarm base. This releases the clapper and permits the alarm to sound. The end of the plunger stem is connected with the bell-crank lever through a set-screw. By adjusting this screw the alarm can be made to sound at any desired temperature.

THERMOSTATIC FIRE-ALARM.

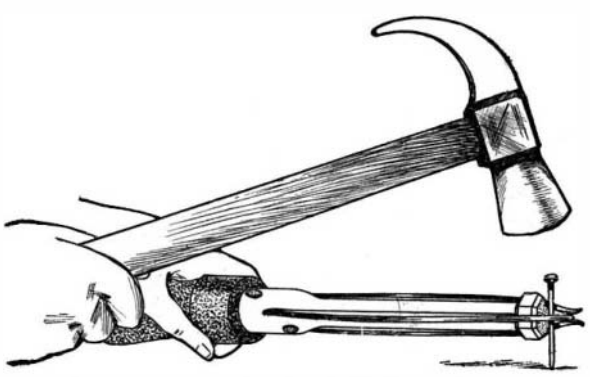
STAPLE EXTRACTOR AND HAMMER.—A United States patent has been recently issued for a combined staple extractor and hammer, which comprises a handle having a side portion cut away at one end and edge and having a rounded extremity. A member is pivoted to the handle concentric to the round end and having its long arm combined and arranged to fit snugly in the cutaway portion of the handle. A head at the outer or



STAPLE EXTRACTOR AND HAMMER.

projecting end of the opening may overlap the rounded end of the handle and project beyond its inner or lower edge. The projecting portion forms a hammer, and is notched to provide a claw to overlap the inner edge of the hammer and limit the opening of the pivoted member.

NAIL-HOLDING IMPLEMENT.—A man who has evidently experienced the difficulties of tacking down a carpet or hammering small brads and nails in inconvenient places has invented a simple hand implement adapted to hold the nail until it has been properly started. The construction of this instrument, which will be readily comprehended by a glance at the illustration, is of the simplest order, comprising a number of spring fingers secured at their inner ends to a body portion and held in alignment near their outer ends in

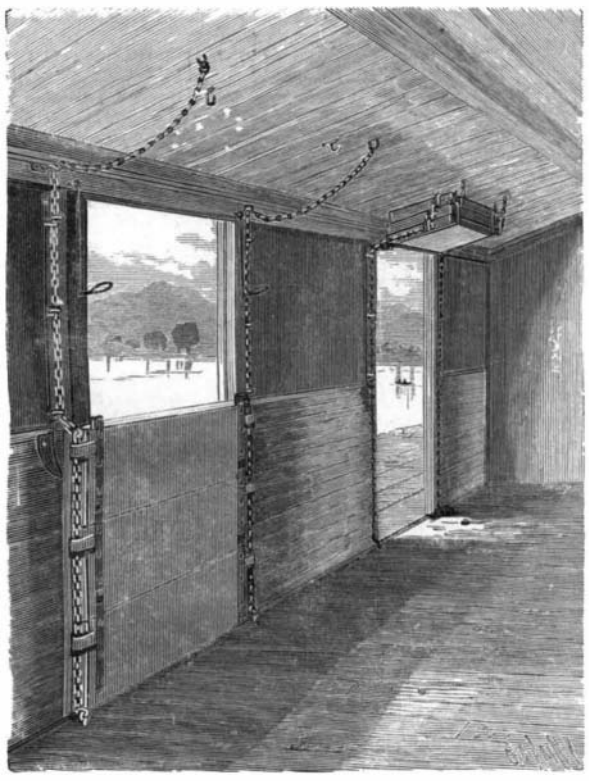


A HANDY NAIL-HOLDING IMPLEMENT.

the channels of a headpiece. The spring-fingers are adapted to hold the nail firmly against the end of this channeled head. The extremities of the spring-fingers are so formed as to readily receive the nail and permit of the withdrawal of the instrument after the nail has been partly driven. A patent for this device has been recently granted to Mr. Frank Boelk, of Walton, Minn.

IMPROVED GRAIN DOOR.

It is found necessary in railroad transportation of grain that the freight cars be provided with an inner or auxiliary door to form an extra tight closure and



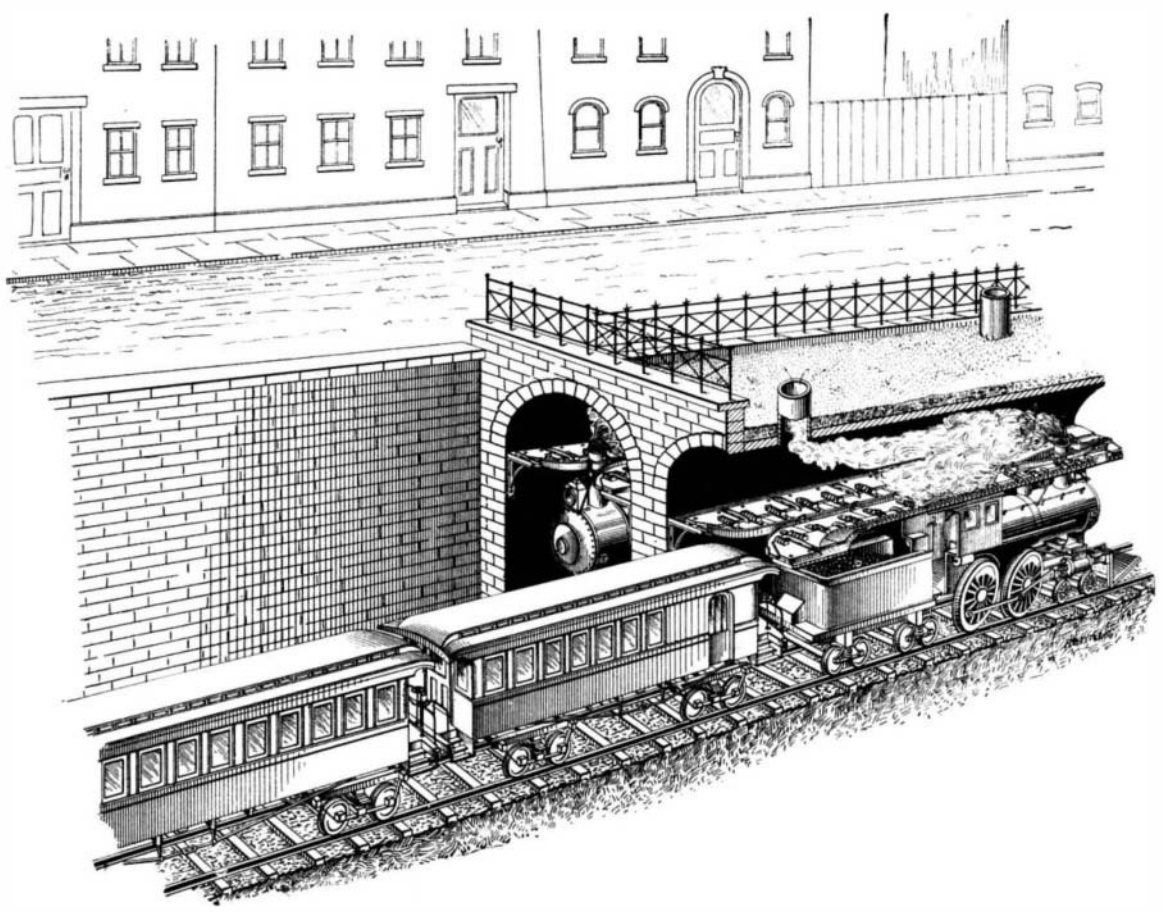
IMPROVED GRAIN DOOR.

prevent leakage of the grain. A door of this sort is provided by the recent invention of Mr. Alva T. Stark, of Geneva, N. Y. This door is composed of several sections or panels, which may be secured collectively or separately in a great variety of positions, or if desired, they may be folded up under the roof of the car, thus offering no obstruction to the door opening. Our illustration shows one of these doors in the lowest closed position and the other folded up and out of the way. The panels, which are preferably made of wood, are provided with vertical grooves at each end in which lock-plates are fitted. These lock-plates project above their respective panels, so that the upper ends of one pair of lock-plates will engage the lower ends of the grooves of the panel just above. Thus a tight connection is afforded and the grain is effectively retained. At each side of the car door is a chain, which is fastened at one end to an eye-bolt in the floor and at the other to the ceiling. The chains are provided at regular intervals with eyes which are adapted to engage hooks at each side of the door. The lock-plates on the panels are provided with guides, which loosely receive the chains and are thus held against the door posts. In order to hold the panels in the closed position indicated, it is merely necessary to draw the chains tightly and hook them onto the first hook above the highest panel, thus firmly locking the door in place. When loading or unloading the car, if it be desired to decrease the height of the door, this may be readily done. The uppermost panel is raised to the required height and locked in this position by the chains, which are hooked on the proper hooks above and below the lock-plates. When desired the next panel can be similarly raised and held, or all three of the panels may be lifted from the floor so as to facilitate the discharging of the cargo into chutes or hoppers. Pivotally fastened to the framing of the car at the top of the doorway are two arms which terminate in laterally bent eyes. These arms serve to hold the sections of the grain door in their folded position against the roof of the car, as shown at the rear in our illustration. It will be observed that when thus folded the panels all lie above the door opening and the door offers no incumbrance to the loading and unloading of the car.

SYSTEM FOR VENTILATING TUNNELS.

The main objection to crowded steam railway tunnels—an objection which was strongly emphasized by a recent disaster in New York city—is the lack of proper ventilation. Steam and smoke obscure the danger signals, thus endangering the lives on the train, and the air is vitiated by the cinders and gases so that all windows and doors must be closed—obviously a great annoyance to passengers in summer weather. Mr. John Kress, a citizen of New Rochelle, N. Y., who has daily experienced these annoying conditions, has suggested a novel method of avoiding this smoke nuisance. Since all the objectionable gases come from the smokestack, he proposes to provide a separate tunnel for the smokestack to discharge into, thus leaving the air in the main tunnel pure and uncontaminated. To this end Mr. Kress has invented the arrangement shown in our illustration. The tunnel is divided longitudinally into an upper and lower portion by a horizontal partition. This partition, which is placed at a sufficient height to clear the top of the cars, is made of two sections, which are supported by brackets on the side walls of the tunnel. Each section comprises two stationary plates, between which a series of spring-cushioned slide plates are adapted to slide. these slide-plates are provided with contact flange sections, which are interlocked with each other, so as to permit a slight play whereby an individual flange may be sprung out of its normal position without interfering with the positions of the adjacent flanges. The contact flanges of each section meet along the center line of the partition except at the ends of the tunnel, where, together with the slide-plates, they are rounded off to facilitate the entrance of the smokestack of the locomotive. The smokestack of the locomotive is provided with an extension piece fastened thereto and securely braced, which is adapted to pass in between the contact flanges. Friction bands on this extension piece serve to take up all wear from the friction of the flanges. As the smokestack passes along the flanges, the sections yield successively before the advance of the stack, but close up immediately after the transit of the same. Thus only a small elongated opening is left between the two divisions of the panel and all the smoke is confined to the upper division, whence it is drawn off by suitable ventilators, as shown, while the cinders which collect on the guide plates can be swept off from time to time into chutes at the sides of the tunnel. The air in the lower portion of the tunnel, therefore, remains pure, and there is no necessity of closing doors and windows of the cars in hot, stifling weather.

N. W. Gales, of Waterloo, Iowa, has perfected an improved disk for use in cream separators which greatly increases the efficiency of the machine. The disk instead of being plain is corrugated, and this is the essential part of the improvement. He has recently sold the right to manufacture this disk to the Clinton Separator and Engine Company for the sum of $83,000.

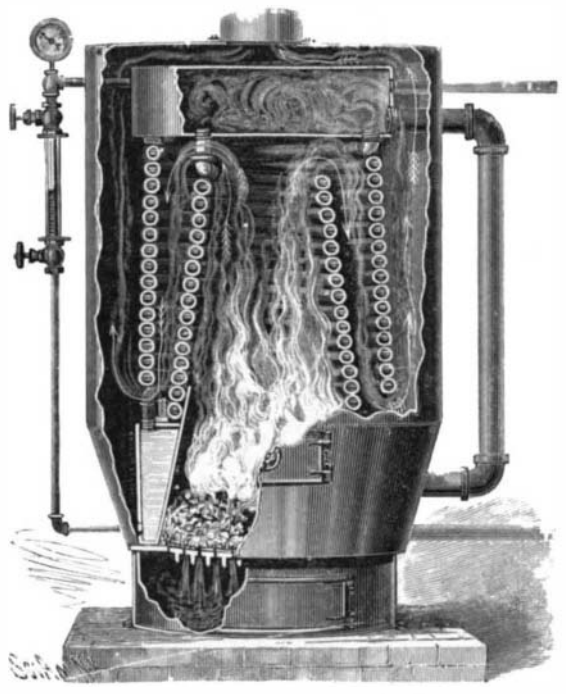


SYSTEM FOR VENTILATING TUNNELS.

HEATER AND BOILER.

An improved form of hot-water heater, which may be readily converted into a steam boiler, has recently been invented by Mr. Nathaniel B. Wales, of Braintree, Mass. The heater combines a great heating surface, a complete utilization of the products of combustion, and a simplicity of construction which obviates all danger of leakage.

The peculiar construction is clearly illustrated in the engraving, which shows the main casing partly broken away to expose the interior details. It will be noticed that the firebox is surrounded by a water chamber from which two frusto-conical coils of tubing extend upward. These tubes connect the water chamber with an upper chamber at the top of the heater. The



HEATER AND BOILER.

several turns of tubing in each coil are laid in close contact with each other, so as to form walls for guiding the passage of the hot gases from the firebox. As indicated by the arrows, the gases are forced to pass through the top of the inner coil, over the same, and down between the two coils, whence they pass out under the outer coil into the main casing of the boiler and up through the chimney. Thus it will be seen that the heat of the gases is utilized to the greatest possible extent. The inclined walls of the firebox and the coils afford a much more effective heating surface than if these walls were perpendicular. A feed, blow-off and water-return pipe enters the water chamber near the bottom, while a water-circulating pipe provides an outlet for the upper chamber.

Such is the arrangement when the invention is used as a heater, but the same construction may be used as an ordinary steam boiler by simply adding the usual steam and water gages, the pressure gage and a circulation pipe connecting the water chamber with the upper chamber. The upper chamber now serves as a steam drum, and the water level would be between the upper turn of the inner coil and this drum. The water-circulating pipe now serves as a supply pipe for the steam. All connections between the coil tubes and the iron castings are made with brass unions, so that the parts may be readily taken apart when desired, and there are no joints to spring and cause leaks.

At Westfield, Chautauqua county, N. Y., the remains of a great mastodon were unearthed. Various bones among which are the following, were found: Shoulder blade, with socket for articulation of foreleg; hip bone; section of spinal column containing four vertebræ; sections of both extremities of spinal column; knee cap, nine ribs and some other bones. The ribs are 4 feet 3 inches long and 4 inches wide. Two mastodon skeletons have been previously found in this county, one at Sheridan and one at Jamestown, but both in an advanced stage of decay.