

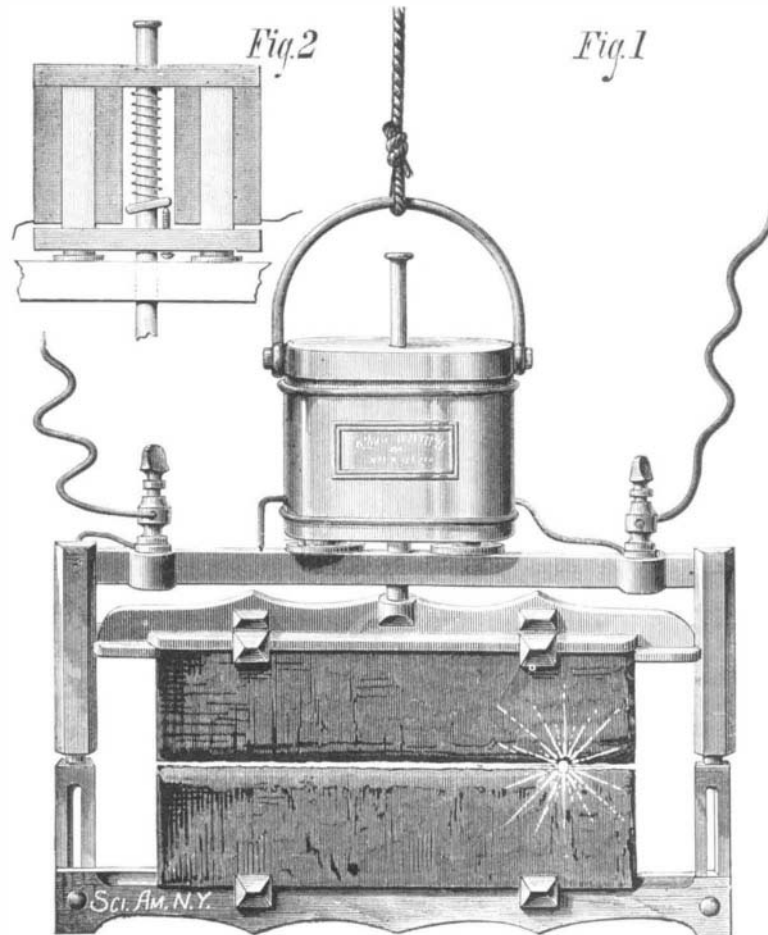
**THE WALLACE-FARMER ELECTRIC LIGHT.**

The Wallace-Farmer system of electric lighting has been brought prominently forward in England within the last few weeks, and is quietly being pushed forward in this country. The lamp, which is the subject of the accompanying illustration—Fig. 1 being a perspective view and Fig. 2 a sectional view of the magnet—consists of a metal frame of brass, fitted with terminals for the current, as shown. This frame carries the two gas carbons forming the electric wick. These carbons are in the form of short rods or slabs about 9 inches long by 3 inches broad, the upper, or positive, being about half an inch thick, and the lower, or negative, being only about a quarter of an inch thick. The lower carbon is fixed to the bottom of the frame, and the upper is carried by a crosspiece, which can slide up or down in grooves in the sides of the frame. The upper carbon is therefore movable, and can be drawn apart from the lower one to any adjusted distance, say one eighth of an inch, so as to determine the luminous arc. When the lamp is not in use, this upper carbon is let down into contact with the lower one, and rests upon it; but the act of putting on the current raises the upper carbon one eighth of an inch and establishes the light. This is effected by means of an ingenious electro-magnetic contrivance, supported above the frame and shown in Fig. 2. The vertical stem, which is fixed to the sliding crosspiece carrying the upper carbon, passes between the two bobbins of a double poled electro-magnet, shown in section. This magnet is inverted, the free poles and movable armature being undermost. This armature, which is perforated to allow the stem to pass through it, carries a screw, which, when the armature is attracted upward by the current, tilts a small metal ring, or washer, hung from a spiral spring, and inclosing the stem into an inclined position, so that it jams the stem tight and holds it fast in the manner delineated. The first act of the current, then, after it is put on, is to attract the armature until it jams the stem attached to the upper carbon, and the armature being further attracted into contact with the poles of the electro-magnet, it lifts the stem with it, and raises the upper carbon plate until its lower edge is about one eighth of an inch above the upper edge of the lower plate. The arc then either establishes itself at the points of least resistance between the two carbons, or it may be established at any place desired, say at one corner, by inserting a metal conductor for a moment between the two carbon edges. The arc once started continues to subsist at that point until the consumption of carbon

widens it to such a degree that a shorter and less resisting path for the current is to be found at a neighboring point. The current then chooses this point, and the arc is established there, until waste of the carbons causes it to shift its place as before. In this way the arc travels slowly along the whole edge of the carbons, and when it reaches the other end it turns and comes back again. For 100 hours the light

will of itself fall away from the poles, and the carbons will close up to each other in this manner. This causes the current to regain its full strength, and the armature being again raised, the upper carbon is again withdrawn from the lower and clamped, and the light thus restored automatically.

It will be understood from our description that the upper carbon cannot be withdrawn in this manner from the lower one to a distance over one eighth of an inch, the determined range through which the armature can move. Thus, however much the carbons may have been wasted away, at the resetting of the arc they are always withdrawn one eighth of an inch apart.

**THE WALLACE-FARMER ELECTRIC LAMP.**

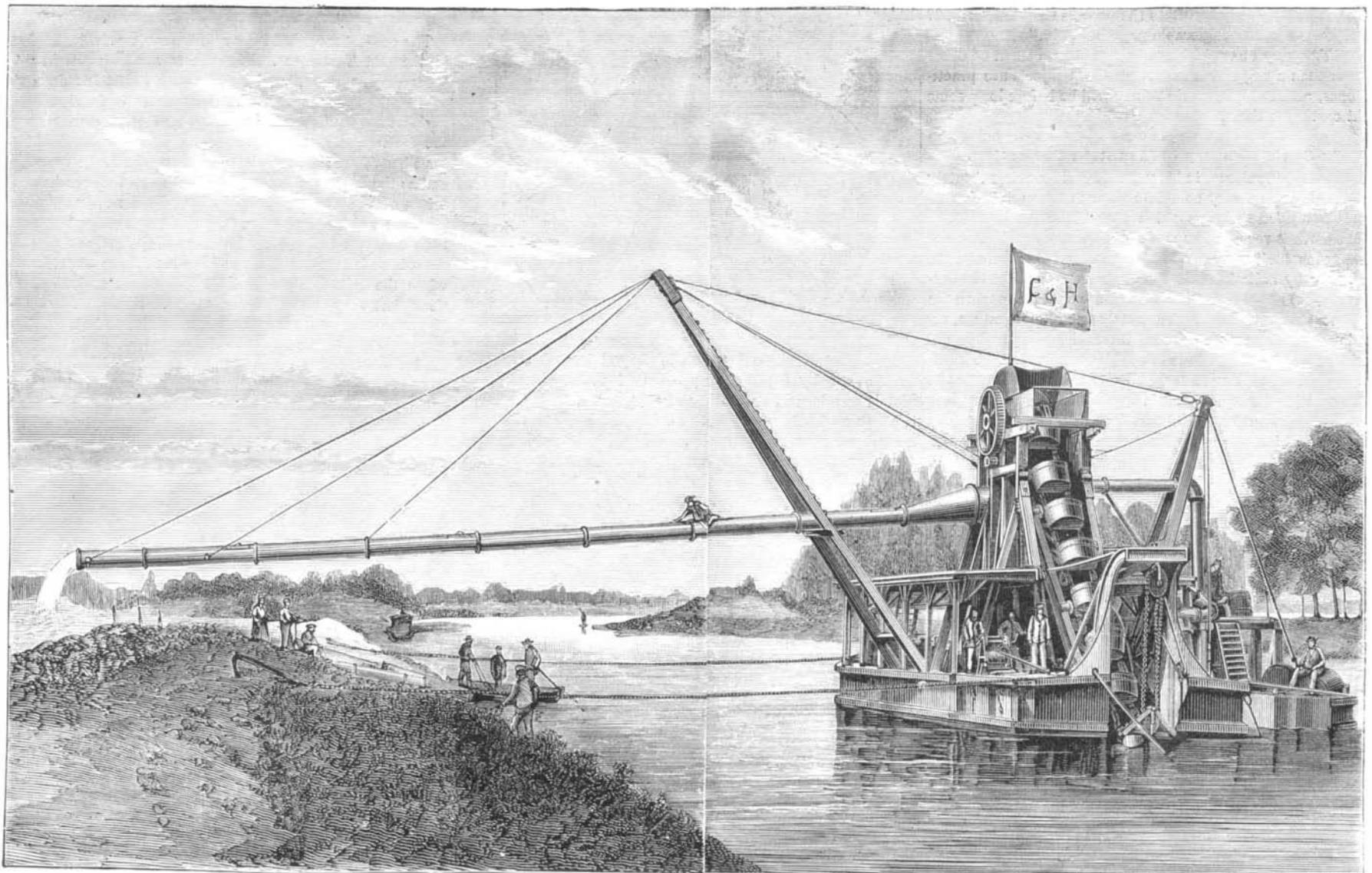
can, in this way, be maintained without change of carbons and at a cost of about two cents per hour per lamp for the latter. When the current is cut off, the armature falls away from the poles of the electro-magnet, the screw releases the clamping washer, the vertical stem is freed, and the upper carbon drops down into contact with the lower carbon. When the distance between the carbons becomes at any time too great and the current is enfeebled, the armature

The proportions generally used are three parts of water to one of sand.

The floating excavators are placed on two hulls, carrying an iron framework on which is mounted the staging supporting the bucket wheel. The engines and boilers are installed in one of the hulls, and in the other is placed the pump and engine for driving it. The upper level of the conductor is 78 inches below the bucket wheel. The con-

**EXCAVATOR ON THE GHENT AND TERNEUZEN SHIP CANAL, BELGIUM.**

The floating dredgers employed in making the excavations on the Ghent and Terneuzen ship canal are 88 feet 7 inches long, 19 feet 8 inches wide, and 7 feet 9 inches deep; the arm is 39 feet 4 inches long, and passes through the hull. The axis of the driving wheel of the bucket chain is 26 feet 3 inches above the water level. A simple conductor has been used by which the sand and mud excavated can be delivered at a point 140 feet and 150 feet from the dredge and at a height of 13 feet above the water line. The excavated materials fall into the concave conductor, 6 feet below the point of their discharge, and, on falling, they encounter the action of a stream of water which is constantly pumped along the conductor, and by which they are converted into semi-liquid mud; the slope of the conductors is generally 1 in 2,000; it is supported by cables attached to a staging connected with the framing of the dredge, and the base of which rests on the deck of the vessel; the conductor is counterbalanced by a platform, on which is placed the portable engine and pump used for lifting the water into the conductor. This platform is suspended to the dredge in the same manner as the conductor itself, and the general arrangement is shown in the engraving. The supply and the maximum incline depend on the facility of disintegrating the ground, and on the quantity of water contained in the mixture.

**EXCAVATOR ON THE GHENT AND TERNEUZEN SHIP CANAL BELGIUM.**

ductor, 100 feet in length, is of the section corresponding to that of the buckets, 17¼ inches in diameter. It is supported by three cables attached to a staging, resting on the boat and secured to the bucket wheel frame. The slope is 1 in 400, which allows the material to be deposited at a level 22 feet 3 inches above that of the water.

The position of the depots often involves the necessity of transporting the dredged material to distances of 1,200 feet or 1,500 feet from the excavator. In such cases supplementary conductors are added. These are open, and are laid on the ground with a slope of 1 in 1,000. When this mode of transport cannot be adopted, barges are employed to receive the dredged material and remove it to convenient points of discharge.

The contractors for this work have adopted an arrangement which consists of a system of pipes with flexible joints floating on the surface of the water, and connected at one end with a well in the excavator, into which is discharged the dredged material mixed with water to reduce it to the desired consistency, and at the other end with a conduit on the bank where the contents are discharged. This arrangement, only recently adopted, has given every satisfaction.

**THE PENCILLED EAR HOG.**

The Red River hog was described for the first time in the year 1848, by Professor H. Schinz, in his book on mammals as *Sus penicillatus*. Two years later a living specimen was

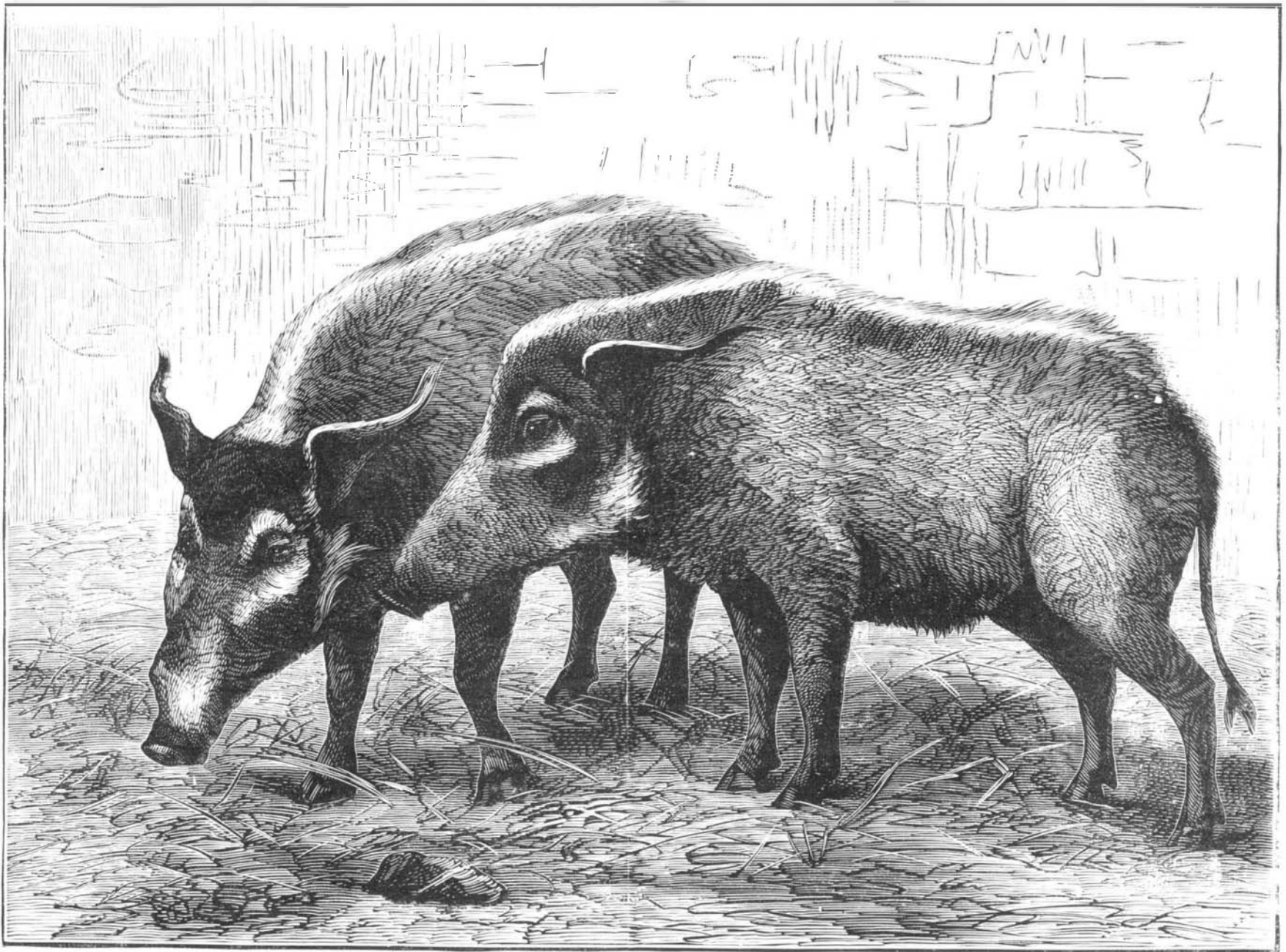
I pulled it out and found it to be a snake of the common 'striped' variety (*Butania*), and about two thirds as long as the milk snake. It had, of course, been swallowed head first, and the head was nearly digested."

**American Dinosaurs.**

On the flanks of the Rocky Mountains a narrow belt can be traced for several hundred miles, which is always marked by the bones of gigantic dinosaurs. The strata consist mainly of estuary deposits of shale and sandstone, and the horizon is clearly Upper Jurassic; the dinosaurian remains in this series of strata are mostly of enormous size, and indicate the largest land animals hitherto known. One new species (*Atlantosaurus immanis*) must have been at least 80 feet in length, and several others nearly equaled it in bulk. With these monsters occur the most diminutive dinosaurs yet found, one (*Nanosaurus*) not being larger than a cat. Some of these new forms differ so widely from typical dinosauria that Professor Marsh has established a new sub-order to receive them, called *Sauropida*, from the general character of the feet. They are the least specialized forms of the order, and in some of their characters show such an approach to the Mesozoic crocodiles as to suggest a common ancestry at no very remote period. In them the front and hind limbs are nearly equal in size; the feet are plantigrade, with five toes on each foot. The carpal and tarsal bones are distinct; the precaudal vertebræ contain large, apparently pneumatic

the business, says that there are not less than 300,000 head of cattle now in the territory. There are several herds numbering from 3,000 to 5,000 head, and one now reaches fully 7,000 head. The average increase ought to be 80 per centum of the number of cows, but one third probably comes nearer the general increase. Four-year-old steers are considered beeves and 25,000 have been driven out of the Territory this year. Montana beef will soon take rank among the staple meats of the Eastern markets.

In making purchases for stocking a ranch a cow and calf would count as one, a yearling one, two-year-old one, and sometimes in making large purchases three-year-olds are included, and the whole would cost from \$13 to \$15 a head. If there were many of the three-year-olds this last price would be demanded. Beeves readily sell for \$25. The larger the herd, the less the proportionate cost of keeping. In one case 50 cents a head a year will fully cover the cost, including taxes, but 75 cents would be nearer the truth generally. The grand "round up" for about six weeks in the spring and one month during the autumn, when the assorting takes place and the calves are branded, is the chief item of expense. Two years ago a gentleman bought 500 or 600 head of yearling steers at an average cost of \$9 each. They were kept near his sheep range, and the expense of keeping was not more than \$2 per head. They sold readily this year at \$25 each, leaving a clear profit of not less than \$14 a head. The profits resulting from this industry, at the



**PENCILLED EAR PIGS AT THE ZOOLOGICAL GARDENS, REGENT'S PARK, LONDON.**

brought to Liverpool from the River Comoro, and was bought in September, 1852, by the Zoological Society of London for their gardens. Mr. J. E. Gray described it in the "Annals of Natural History," in 1852, under the name of *Cheropotamus pictus*. As he, however, soon afterward found out that Cuvier had already given this to a fossil member of the hog family, he changed the original description to *Potamochoerus*. The *Potamochoerus pictus* and *Sus penicillatus* are one and the same animal, which Gray has established without doubt in the "Annals" of the year 1855, and the name "penciled silver hog" has remained as a generic title. The color of the "penciled ear hog" varies very much, and Du Chaillu has met with a white-faced one, which Dr. Gray has declared to be simply a variety of the species.

**Milk Snake Swallowing a Striped Snake.**

Mr. John M. Howey, of Canandaigua, N. Y., states that, in last August, while mowing out fence corners with a scythe, a milk snake (*Ophibolus*) started out of the grass in front of him. He struck it and cut it into two parts, the scythe passing within about three inches of its head. "Imagine," he says, "my surprise when a tail stuck out of the wound.

cavities; the sacral vertebræ do not exceed four, and each supports its own transverse process. The pubic bones unite in front by a ventral symphysis; the limb bones are solid. One of the species described and partly figured in Professor Marsh's paper, in the *American Journal of Science and Arts*, for November, is called *Morosaurus grandis*; when alive it was about 40 feet in length; it walked on all four legs, was probably very sluggish in its movements, and had a brain proportionately smaller than any known vertebrate

**Cattle Raising in Montana.**

While Montana is chiefly noted for its mineral wealth, it is claimed that not a little of its future glory will result from its value as a grazing country. The winters are long, yet horses, sheep, and cattle find subsistence on the nutritious grasses for which the Montana valleys are remarkable, and almost without care or attention. In the assessment for 1877 the enumeration of cattle was 182,659 head, all ages, valued at more than \$2,000,000. To this amount must be added fully 50 per centum for 1878, and then far less than the real value will be covered.

A writer, who professes to be personally acquainted with

lowest possible estimate, are more than 2 per centum a month on the capital invested. Indeed, many persons have borrowed money at that rate of interest and still made a handsome profit.

**Popular Errors Regarding Papyrus.**

In Adams' "Roman Antiquities" the Egyptian papyrus plant is described as about ten cubits high, and as having several coats or skins one above another like an onion, which coats were peeled off with a pin in the process of paper making. In Smith's "Dictionary of Greek and Roman Antiquities," it is said that the papyrus tree grows in swamps to the height of ten feet or more, and paper was prepared from the thin coats or pellicles which surround the plant. Liddell & Scott's Greek Lexicon says that paper was made of the inner bark of the papyrus. And similarly other works of high character, encyclopedias and the like, give a false account of this interesting plant.

Calling attention to these misstatements, in the *Library Journal*, Mr. Ezra Abbott, of Harvard University, says: "The papyrus plant (*Cyperus papyrus* of Linnæus, or *Papyrus antiquorum*, Willd.) belongs to the family of *Cyperaceæ*