

The Missouri Tornado of April 14, 1879.

Dr. J. L. R. Wadsworth and Francis E. Nipher, Secretary of the St. Louis Academy of Science, have made and published a careful study of the tornado which wrecked a portion of Collinsville, Mo., last April. The storm reached St. Louis at 2 P. M. From this point it pursued an even course with the same velocity, reaching Collinsville, 10½ miles east, at 2:35; Lebanon, 21 miles east, at 3; and Highland, 29 miles east, at 3:30 (St. Louis time). It would seem that the necessary elementary conditions for the development of the tornado were found over the American Bottom, and that this development was purely local and did not extend much over ten miles, and had no apparent influence upon the general storm that was passing at a higher altitude to the eastward. The tornado consisted of a principal vortex, of very considerable power, accompanied by six collateral vortices, of much less power, that seemed to possess more than an incidental relationship to the principal; and a second principal vortex apparently independent in time and direction. The direction of the principal vortex was 15° north of east, and, while there was a probable swaying to the one side or the other, the paths of the vortices were in straight lines. The first four collateral vortices were *convergent* upon the path of the principal vortex, and the two last were *divergent*. The principal vortex was in contact with the surface while it was receiving the first four, and had left the surface before it gave off the last two collateral vortices. The height of the principal vortex was about 500 feet; the heights of the collaterals were comparatively small. The rotary spiral motion was in the direction opposed to the movement of the hands of a watch and of great velocity. The progressive motion was about one mile a minute. It had also a vertical or lifting motion, which was often quite abrupt. The path was narrow on the approach to Collinsville—about 100 feet, gradually widening—the vortex at the same time exhibiting less force. At the zinc works it was 600 feet wide. Its lifting power was sufficient to carry large roofs at least 600 feet high; this, with a power equal to the momentum of a body moving sixty miles an hour, would carry heavy *débris* some distance. The effect of these motions was to break up every object the whirl carried up with it; even lumber, taken up free from all contact with anything else, would come down, in many instances, in kindling wood.

In about half an hour after the vortex passed there was a return current from the north, accompanied with severe rain and hail and terrific electrical discharges. There was no thunder and lightning with the vortex, and very little if any rain.

The difficulty in obtaining exact and comprehensive information, from eyewitnesses, of what goes on in a storm of this nature is aptly illustrated by the following incident: A clear-headed and observant citizen of Collinsville, perceiving the approach of the storm, although some blocks distant, ran from a very dangerous position, and found himself only across the street, holding on to a loose stump, when the tornado passed over him. Afterward, while detailing the predicament he was found in, a bystander called attention to a large tree which had just escaped falling upon him. Looking at it for a moment, he quaintly remarked, "I never knew that tree fell there."

A New Weather Theory.

The Rev. Henry Roe, F.R.A.S. (Eng.), sends to the London *Times* a new theory of the weather. He claims to have determined by careful observations, covering nearly thirty years, that dry and wet periods succeed one another in alternate waves of nearly equal length. Not that this equality of duration is quite absolute, or that the wave of one period is exactly the same *facsimile* of that of a corresponding period at an earlier or a later time; but there is enough of regularity and uniformity about the waves to make the family likeness clearly discernible to any eye that looks for it.

These periods extend over three whole years for each, and the following simple rules will enable any one to work out the several cycles of years for himself:

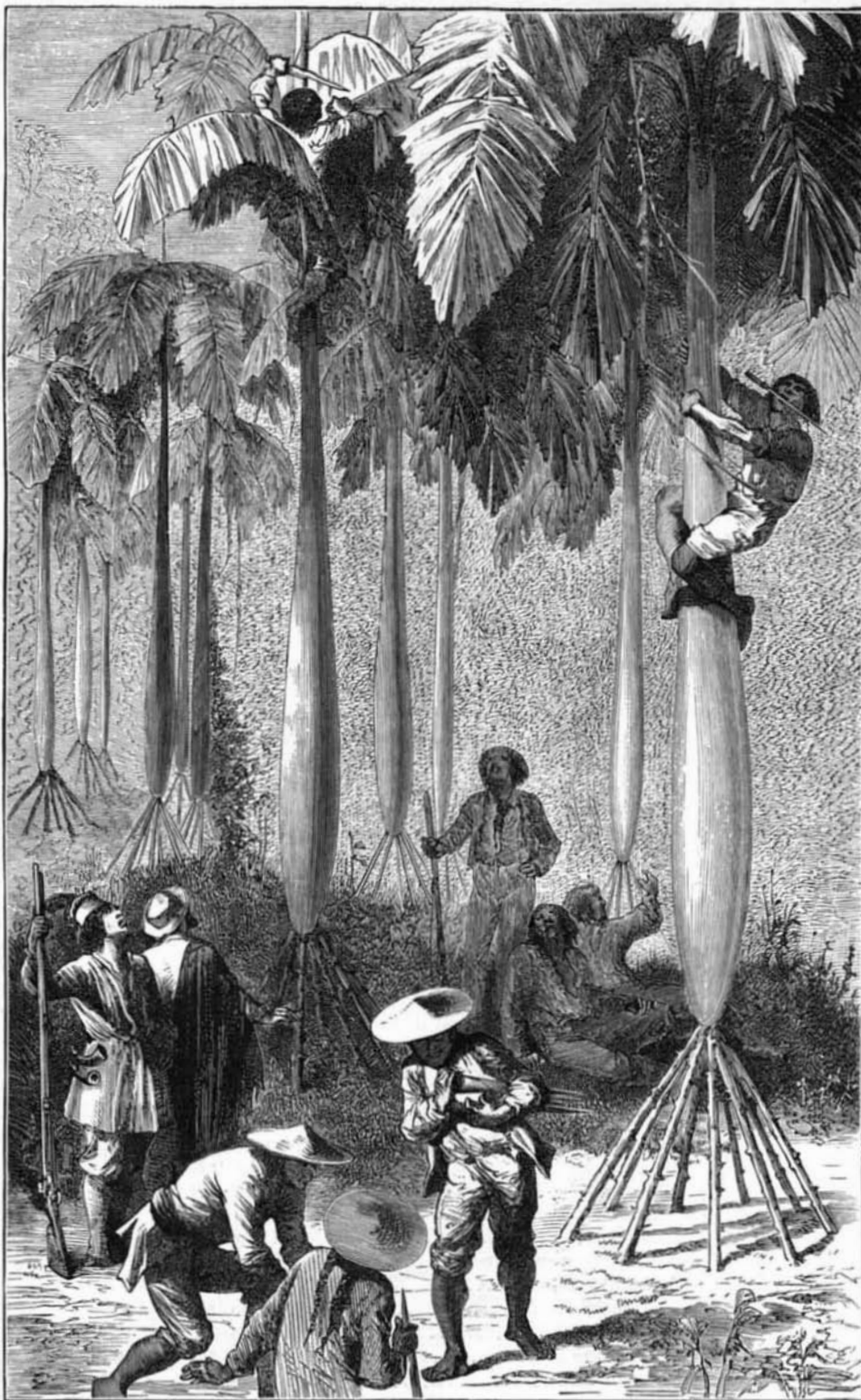
1. When the number representing any given year is even and exactly divisible by three, that year is the middle one of three cold and wet summers,

2. When the number representing the year is odd and divisible by three, then that year is the middle one of a triad of dry and hot summers.

After testing by these rules the successive seasons of the past twenty-seven years, and finding fact to conform to theory, Mr. Roe predicts that 1881 will be the middle one in a triad of hot and dry summers. What relations these dry and wet periods have (if any) to the recognized cycles of sun spots he has not made out; nor does an examination of recent seasons confirm the alleged harmony of theory with fact.

THE SWELLED TRUNK PALM.

The lower part of the trunk of this peculiar palm tree is swelled and supported from seven to nine feet above the ground by a number of radiating and inclined roots. These roots shoot out from the tree during the rainy season, and support it without aid from the main root, which finally dis-



THE SWELLED TRUNK PALM.—*Iriartea Ventricosa Mart.*

appears. The leaves are from 10 to 14 feet long. This tree is found on the banks of the Amazon. The illustration is copied from *La Vie Végétale*.

An Explosion of Starch.

Nearly two years ago a violent explosion occurred in a candy factory in this city, causing the death of thirteen persons. The cause of the explosion was never clearly known, though the evidence pointed strongly to the starch room as the source of the disaster. A similar, but fortunately less fatal, accident occurred in another candy factory in Elm street, August 7, under conditions which leave no doubt that starch dust was the explosive material.

The explosion took place in a drying room on the second floor, where the temperature ranges from 140° to 180°. The drying rooms are 5 feet by 6 and 6 feet by 8 respectively, and are 12 feet high. In each is a furnace kept constantly red hot. The walls are built strongly of brick incased in wood. In the rooms are arranged slides for starch boxes, in which the candies enveloped in powdered starch are placed to dry. The small room has slides for 2,000 boxes, and the large room slides for 3,000. Four men were at work in the drying room taking the candies from the racks. One was on

a step-ladder to hand down the trays to the others, who stood around the furnace. He had five trays in his hands, and was about to hand them down when his foot slipped on the step-ladder, the trays fell, and in falling turned over so that a heavy cloud of heated starch dust was thrown against the red hot furnace. The sharp explosion that followed shook the building and filled the room with a sudden flame. The intensely dried woodwork of the drying room caught fire instantly, and the apartment was swept by flames which threatened the entire building. The hands of the factory, however, attacked the flames and extinguished them before any serious damage had been done. The four workmen were severely but not fatally burned.

MECHANICAL INVENTIONS.

An improvement on what is known as the "slow" or bark tanning process has been patented by Mr. George King, of Washington, D. C. Its chief feature consists in alternately subjecting the skins or hides to the action of fresh tanning liquor, then raising them out of it and allowing the liquor to drip or drain off, and, lastly, conducting that portion of the drained liquor which was last in contact with the hides back into the leach to be again passed through the bark, and thus strengthened by taking up an additional quantity of the astringent principle or tanning agent. The apparatus consists of a rotating drum, in whose several compartments the hides are placed, and into which the tanning liquor is constantly fed, and from which it is being constantly withdrawn when its strength has become partly exhausted.

Mr. William H. Watson, of Cheshire, Ohio, has patented an improvement in hay presses which embodies several novel features that cannot be clearly described without an engraving.

Mr. James A. Webster, of South Boston, Va., has patented improved attachments for sawing machines, for converting a sawing machine into a planing machine at a small expense, so that the timber may be sawed or resawed and dressed upon the same machine.

An improvement in the class of wooden axle-skeins provided with a tapering extension for receiving the ends of the axle, has been patented by Mr. Philip Neder, of Stockton, Utah Ter. The improvement consists in hooks, by which the skein is secured to the axle, so as to prevent its endwise movement thereon.

Mr. Joseph V. Morton, of Winchester, Ky., has patented a door fastener that is adjustable to doors of different thicknesses. The invention consists of two handles pivoted to a common connection that extends through the door and connected at the top with a wedge piece that operates the latch. The handle on one side of the door is pushed to open the door; the handle on the other side is pulled.

An improved device for feeding paper to ruling machines has been patented by Mr. John S. Young, of Philadelphia, Pa. It is simple and reliable, and is capable of feeding the paper to the machines

one sheet at a time or continuously. It may readily be adjusted to feed thicker or thinner paper, as may be required.

An improved machine for forming dovetailed veneer boxes, so constructed as to form the boxes out of seasoned veneer, has been patented by Mr. David F. Noyes, of Lewiston, Me. The machine, although very simple, cannot be explained without an engraving.

Mr. Harvey Smoot, of Maurertown, Va., has patented a washing machine that is an improvement upon the washing machine constituting the subject of letters patent No. 127,075. In that machine a reciprocating dasher or plunger alternately exerts mechanical pressure on the clothes, and changes their position by the force of the reactive flow of water. The improvement pertains to a trough-like support, receptacle, or holder for the clothes while being soaped, and after having been washed.

Improvements in the buckets of turbine water wheels and the devices for operating the gate ring and governing its movement, have been patented by Mr. Isaac Mallery, of Dryden, N. Y. The object of the invention is to increase the power and durability of the wheel and simplify its construction.