A Great Military Balloon.

A large dirigible balloon is being constructed at the military balloon works at Chalais-Meudon, under the direction of Commandant Renard. It will be similar in form to the La France of 1884-5, but longer; measuring about 230 feet in length and 43 feet in its greatest diameter. By a new arrangement of motor it is expected to be able to make headway against air currents not exceeding 40 feet per second, or 28 miles an hour. The motor is not fully described, but it will act either with gasoline or the gas of the balloon, giving an effective force of 45 horse power on the shaft. The total weight of machinery, with supply of gasoline, etc., will be about 66 pounds per horse power. Previously it has not been possible to make petroleum motors with a less weight than 150 to 200 kilogrammes per horse power. The screw will be in front, and a large rudder behind; the former will make about 200 turns per minute. The first experiments with this balloon are, it is said, to be made in the early spring.

PERFORMING CATS.

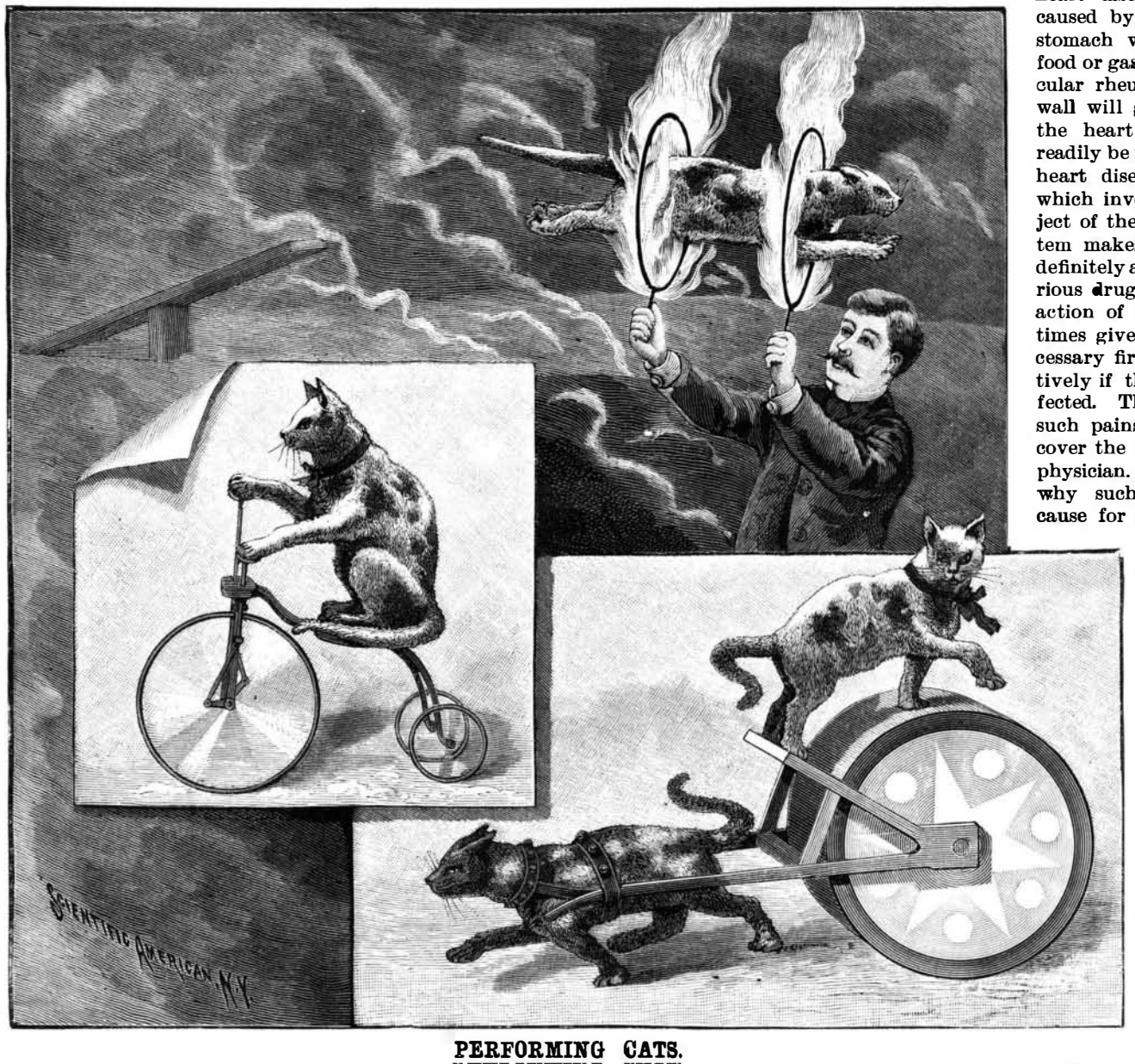
A very remarkable exhibition of performing cats has been produced recently in this city, some features of which we illustrate. As the art of wheeling is now attracting much attention, our performers show how nearly they can come to propelling a velocipede. The cat, it will be noticed, prefers to use her fore feet, much as if a man propelled himself by his hands. The plunger mechanism for reaching the cranks is intelligible from the cut. It is questionable if the cat would not prefer her natural method of progression. She shows no signs of developing into a bicycle crank. The question of dress for wheeling need not agitate the lady cats, Jenness Miller and divided skirts not being within their ken.

Next we see a cat pulling a roller, on which a second cat is riding and working her passage treadmill fashion. By proper application of her energy, it is evident that the rider could do her part in accelerating the progress of the machine. Whether she does so or not, may be doubted.

These two achievements are striking, although somewhat in the line of the ordinary acrobatism displayed by cats in their rambles over roofs and fences. But the third act depicted by our artist shows us our feline friend in a new role, that of fire king. The trainer holds up two hoops which have been dipped in naphtha, which is all ablaze. The cat at the word, starting from a spring board, jumps through the hoops and passes the ordeal unscathed. The jump is repeated a number of times.

The passion of humanity for seeing animals do abnormal things would seem to be gratified in this exhibition. At the same time the training of cats to do these feats really constitutes an achievement and in that sense seems worthy of due recognition.

The above constitute the principal performances, but others are also shown. Thus a wagon load of cats is drawn by their comrades. The performances take place on an oblong table, with large opening in its center where the exhibitor keeps himself.



PERFORMING CATS.

Mails Burned.

In consequence of the recent collision on the Pennsylvania Railroad near Dean's Station, N. J., the mail car was consumed so rapidly that it was impossible to save anything. There was a four-wheel truck load of mail from Philadelphia, destined for New York City, Boston, Springfield, Providence, and intermediate points, and three pouches from Trenton for New York and Jersey cities.

The transfer agents also reported that some of the pouches which should have been received three hours earlier are also missing, and were probably in the burned train. These contained mails from Philadelphia and Baltimore for New York and Brooklyn; also the departmental mail from Washington for New York, Rochester, and intermediate points, besides pouches from Lancaster, Pa., Chester, Pa., and Wilmington, Del., containing mails for this city.

Correspondents of the SCIENTIFIC AMERICAN whose letters prove to be missing should bear in mind these serious losses of mail matter.

A NOVEL TOY.

The annexed engraving represents an amusing toy recently sold on the streets of New York. It is not

THE "MIKADO," A NEW TOY.

particularly scientific, but it shows how a device having little novelty finds sale in places traversed by the multitude.

It consists of the figure of a Japanese in sitting posture, representing the "Mikado." In his right hand he holds a Japanese umbrella, and in his left a fan. The umbrella is provided with a little reel at the top. The stick of the umbrella, in this case, is formed of a tube which is held by the hand of the Mikado, and a spindle attached to the umbrella top and passing through the tube with its lower end resting upon a beveled wheel journaled within the figure. The beveled wheel carries a crank pin working in a slotted arm that extends through the side of the figure and grasps a fan, as shown in Fig. 2. When a cord is wound around the reel at the top of the umbrella, and drawn off after the manner of top spinning, the umbrella spins, giving a rotary motion to the beveled wheel, and the crank pin projecting from the wheel imparts an oscillating motion to the arm carrying the fan. The umbrella being slightly out of balance gives a vibratory motion to the figure, which causes it to rock slightly and turn upon its support.

Aids for Temporary Star Search.

The following extract from a note by Mr. D. E. Packer in *English Mechanic* may be of use to some of our readers:

"During the recent summer months, in our leisure evenings, Mr. Morris, of Cambridge, and myself were engaged in searching the heavens (especially the Milky Way region) for the detection of new stars. In order to expedite our search, we adopted a scheme which, I think, will find favor with those who are similarly occupied on starry nights, and for which we strongly advocate a trial. We used the excellent maps in Schurig's 'Tabulæ Cœlestis,' which give all, or nearly all, stars down to the sixth magnitude. The charts were photographed on quarter plates, and the negatives, backed by tissue paper or an ordinary screen glass, were projected in front of a small bull's-eye lantern. A convenient method was thus obtained of comparing any portion of the chart with its corresponding portion in the heavens. It only required the use of an ordinary magnifier to enlarge any portion of the photographed chart to render comparison easier, and the apparatus was complete. The ease and comfort with which considerable areas of sky were swept over, and the enormous saving of time which this method affords over the ordinary method, a trial will suffice to show. Regions near the zenith were viewed by projection in an ordinary mirror, the photographed chart being correspondingly inverted."

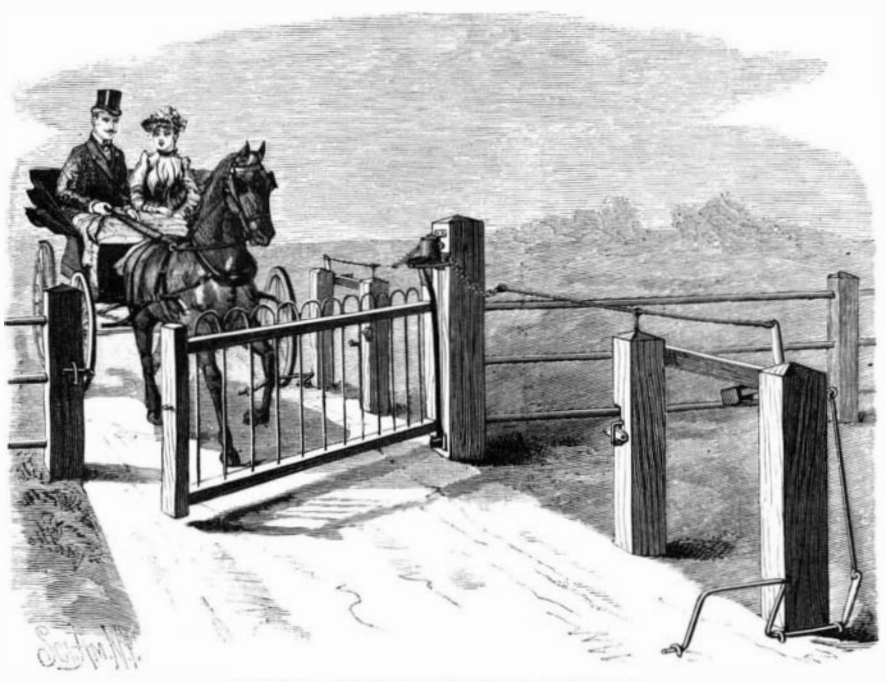
Pains in the Heart Region.

Pains in the region of the heart, says a writer in the New York *Ledger*, are common, and the general dread of this disease makes many people imagine that they have heart disease when there is any local affection in this region. Many who think they are suffering from heart disease have their pain caused by the pressure of the stomach when distended with food or gas. Neuralgia or muscular rheumatism of the chest wall will give similar pains in the heart region, which may readily be thought to come from heart disease. The obscurity which involves the whole subject of the heart's nervous system makes it impossible to tell definitely about such pains. Various drugs, which will slow the action of the heart, will sometimes give relief. But it is necessary first to ascertain positively if the heart is really affected. Those who suffer from such pains can frequently discover the cause better than the physician. There is no reason why such pains should give cause for alarm. Even though neuralgia or rheumatism is causing pain in that region, it is not essentially dangerous. The best plan at such times is to keep in a dry place, avoid draughts of wind, rain or wet weather, and remain in a lying posture for hours. This gives the heart rest and gradually strengthens it. Hot, dry applications over the region are always good. Those suffering from neuralgia and heart disease should always apply hot flannels over the region of the heart when the pain is severe. This will prevent the neuralgia from settling in this organ, the most dangerous spot.

THE municipality of Cadiz, Spain, offers a premium of 30,000 pesetas ($6000) to the author of the best plan for a proposed sewerage system. The competition remains open until December 20, 1893.

AN AUTOMATIC GATE OPERATING DEVICE.

A gate opening and closing device, which will be automatically operated by an approaching and departing vehicle to open and close the gate, without the necessity of any one getting out of the carriage, or the aid of a gatekeeper, is shown in the illustration, and has been patented by Mr. Silas Portis, of Monrovia, Ind. On a pintle supported by the swing post is pivoted at the bottom one stile of the gate, the upper end of the stile being pivoted in an arm sliding on a curved rod secured to the upper portion of the post, and the



PORTIS' AUTOMATIC GATE WORKER.

arm having an upwardly extending portion embraced by a staple secured to a revoluble drum. The free end of the arm is within a semicircle formed by the curved rod, and the upper pintle of the stile projects through the staple, so that when the latter swings it bears on the pintle and on the upwardly extending portion of the arm. On the drum are reversely wound chains extending to opposite sides, their free ends connected with rods connected at their outer ends in each direction to one arm of a weighted lever pivoted on a post at the side of the road, this lever being connected with a rod bent to form a crank in the path of the wheels of a vehicle. By this arrangement, when the chain at one side is pulled, as by the pressure of a vehicle wheel on the first crank, the drum is revolved in a direction to open the gate, and when the chain at the other side is pulled, from the pressure of the vehicle wheel on the second crank, the drum is revolved in the opposite direction to close the gate. The latch gate post has a recess in its side next the gate in which enters a lug on the outer edge of the gate as the latter is swung open, there being a central stop in the recess against which the lug strikes, and on opposite sides of the post adjacent to the recess are latches which swing in vertical keepers. Alongside the carriage way also are posts with similar latches to engage the free end of the gate when it swings open. As the approaching vehicle operates the crank and the chains are pulled, the combined movements of the arm and pintle swing the upper portion of the stile so as to raise the free end of the gate and lift the lug over the latch, swinging the gate open, when it automatically latches, or similarly closing it as the vehicle passes over the second crank.

Further information relative to this improvement may be obtained of Messrs. Taylor & Bennett, Monrovia, Ind.

TO DARKEN OAK.—Oak for decorative work is produced by fumigating the material with ammoniacal vapor, which effectively produces the dark coloring so much desired. In accomplishing this, the method consists in placing the material to be darkened in an approximately air-tight room in which no light enters; or for small work a packing box will suffice, the joints or cracks to be well pasted over with paper. In this room or receptacle for depositing the furniture or other articles is placed a flat porcelain or earthen vessel filled with ammonia, the vessel containing the liquid being, of course, set on the ground or floor, that the fumes or vapor may strike to advantage the articles to be darkened; if the apartment is large, two or more vessels containing ammonia may be employed, and allowed to remain until the desired effect is secured. The ammonia does not touch the oak, but the gas that proceeds from it acts in a peculiar manner upon the tannic acid contained in the oak, browning it so deeply that a shaving or two may actually be taken off without removing the color. The depth of shade depends upon the quantity of ammonia used and the duration of exposure.

SNOW SHOE EXERCISE IN THE GERMAN ARMY.

There are now being made in certain corps of the German army some very interesting experiments relative to the introduction of snow shoes, to permit of marching and service on a campaign in the severest weather.

The snow shoes used by the German soldiers are the same as those that have been employed for centuries in the countries of the north of Europe—Norway, Lapland, etc. They consist, as may be seen from our engraving, of a thin strip of wood about a yard in length, a little wider than the foot, turned under and curved at the extremity and shod with iron. Every one uses them in Norway, and the results obtained are truly wonderful. During the deepest snows the rural postman owes to them the possibility of continuing his service, not only without delay, but with amazing rapidity. The hunters of the country, provided with snow shoes, pursue the hare and dispatch it with a simple blow of the cane. The Norwegian soldiers, it is unnecessary to say, could not remain strangers to this national sport. So, since the middle of the last century, there has existed in their country companies of light infantry broken in to marching on snow shoes and capable of rendering the greatest services in case of a winter campaign. At present all the Norwegian corps of infantry annually perform maneuvers upon the snow with the aid of these shoes, and, in their cantonments, even get up racing matches on snow shoes.

The foot soldiers of the Dutch army are exercised in the same way upon the frozen canals that abound in their country.

Finally, in the Russian army, certain corps (the sharpshooters of the imperial family and the Finnish sharpshooters) are provided with analogous snow shoes.

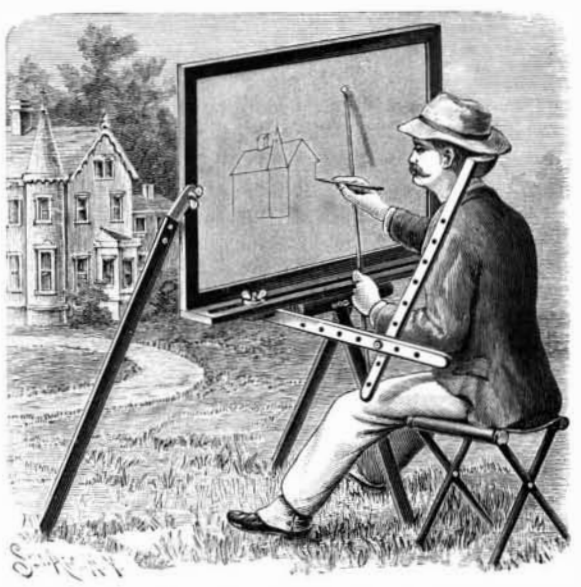
Not wishing to remain in a state of inferiority in this regard, in face of his neighbors, the Emperor of Germany has had snow shoes tried in the Eighty-second regiment of infantry, stationed at Goslar, upon the confines of Hanover and Brunswick.

A model platoon, composed of non-commissioned officers under the direction of an officer, has been trained in the use of the snow shoe, and, thus shod, has executed long marches in the mountains near the city, and all the imitations of battle possible.

Our engraving represents one of these exercises, the platoon making a march forward in battle.—*L'Illustration.*

AN IMPROVED SKETCHING APPARATUS.

The device shown in the picture, to facilitate drawing in correct perspective, forms the subject of a patent issued to Mr. Thomas A. McFarland, of Portland, Oregon. The glass plate on which the sketching is done is cross-ruled with lines so close together that they can hardly be counted, producing a ground glass drawing surface with transparent sight spaces. The plate is inclosed in a frame, to the ends of which are pivoted metallic strips, by means of bolts and wing nuts, the other ends of the strips being bent backward and attached to wooden legs. On the under edge of the frame is a slotted bar in which are eyes to receive a roller to which is clamped an adjustable central leg. To this slotted bar is also clamped an arm on which a head rest is adjustably held, the head rest being thus made adjustable both vertically and horizontally. The sketching thus effected by pencil or crayon on the glass surface may be afterward traced off on tracing paper or cloth.



McFARLAND'S SKETCHING DEVICE.

Perfume in Flowers.

1. The essential oil is generally localized in the epidermic cellules of the upper surface of the petals or the sepals. It may exist on both surfaces, especially if the parts of the flower are completely hidden in the bud. The lower surface generally contains tannin or pigments derived from it.

2. Chlorophyl seems in every case to give rise to the essential oil. The transformation is easily understood if we admit, as it is now generally done, that the parts of the flower are merely leaves modified for a new function. The chlorophyl is thus turned away from its object, and is transformed either into persistent tannin derivatives or into essential oils.

3. The development of the perfume of the flower is not perceptible until the essential oil is sufficiently liberated from the intermediate products, and it is present to some extent in an inverse proportion to the production of tannin and of pigments in the flower. This will explain why flowers with green petals have no odor; why white or rose-colored flowers are most frequently odoriferous; why the Compositæ, which are rich in tannin, have their well known disagreeable odor. —*E. Mesnard.*

SNOW SHOE EXERCISE IN THE GERMAN ARMY.

A Noble Woman's Worthy Act.

Mrs. D. W. Bishop, a wealthy lady of this city, sent her check to this office a few days ago for $107.50, with instructions to furnish a copy of the SCIENTIFIC AMERICAN to every police office in the city during 1893. There are forty-three stations, including the five attached to our public parks.