

Powell has distinguished five kinds of bats here, none of which, however, are of unusual size or appearance.

That the cave was known to the early settlers and explorers of this region is shown by the notched poles which were found in the cave when it was first rediscovered, and which evidently served as ladders for entrance into the cave. Two of these are now to be seen in the Mother Hubbard Room. Local supposition is that these notched trees were used by the Spaniards, as it is known that they occupied the land in this region before the English settlers took possession of it.

The cave as thus described is of considerable extent and possesses variety in scenery and interest. It is well worth a visit, and when the projected railroads from Aurora and Springfield pass near it, it will undoubtedly become a summer resort; but the estimates of the distances, heights and depths which have appeared in certain usually responsible papers and magazines are very wide of the truth. Its unexaggerated beauties are enough to recommend it to the popular favor. The accompanying map represents, as accurately as the circumstances would permit, almost all of the cave that has been explored. It is certain, however, that the cave is by no means fully explored and that further investigation will add largely to this map. At present even Blonde's Throne and Springsted's Throne are practically inaccessible to the average visitor, but a not excessive amount of work would materially lessen the most serious difficulties in the routes.

My special thanks are due Mr. J. D. Robertson, assistant on the Missouri State Geological Survey, and Mr. H. D. Card, draughtsman for the Missouri World's Fair Commission, for their painstaking assistance in making the accompanying map and measurements and the thermometric determinations that are given herewith. To Mr. Powell and his family is due the credit for almost all the exploration that the cave has received.

An exceptionally low temperature, 48° F., was observed at the lowest point of the Grand Amphitheater and in the air and water of the Spring Room. Throughout the rest of the cavern the temperature seemed to be about that usually found in caves, 54° F.

In considering the scientific value of this cave, the fact should not be overlooked that this is the first cavern reported in this country containing mummified animal remains in large quantities.

North Greenland.

Professor Angelo Heilprin recently gave a very interesting address on "The Scientific Results of the Peary Expedition," illustrated by photographs projected by the lantern, before the Engineers' Club of Philadelphia.

The expedition under Lieutenant Peary did not have for its object, as many erroneously supposed, a nearer approach to the North Pole than had yet been reached, but was planned with a definite object, the determination of the northern boundaries of Greenland, which was carried out with unusual fidelity. The basis of operation was not, as usual, the steamship, but the mainland, and the trip extended from McCormick Bay northeastwardly across the ice cap. The entire return distance—1,300 miles—was accomplished on foot, sledges being used only to carry supplies, etc.

The country was found to be bounded by a chain of mountains on both the eastern and western shores, and the trip started at the western shore at an elevation of from 2,500 to 3,000 feet, and continued rising to the apex of the Humboldt Glacier. The ice cap terminated at about 82° north latitude, and open country followed it northward. The northeastern coast was reached in latitude 81° 37', about 4½° further north than had yet been discovered. From this point the directions and general character of the coast in both directions were established for a considerable distance, although it could not be closely explored, on account of the rugged basaltic boulders with which it was everywhere covered. The physical features were found to be quite uniform throughout the country. The mountain ranges averaged about 5,000 feet in height, occasionally reaching 10,000 feet or higher. The basaltic bluffs and boulders on the coast, and the numerous fiords, made it very similar to that of Norway. Inland, between the mountain ranges, there is an apparently endless sea of ice, entirely covering and hiding the true topography.

The expedition solved the problem of the northern termination of Greenland, by showing that it does not extend to near the pole, or northeastwardly, as has been generally supposed. It was also found that glaciers were projected northward toward the pole, and therefore Greenland could hardly have had any connection with the American ice of the great Ice Age, as has often been supposed by geologists.

A narrow border country, having a good vegetable growth and an animal life identical on the east and west sides, extends all around Greenland. The summer temperature there is about the same as that of a mild winter here; the winters are much colder than in this locality, but not more so than in some of our Western States.

There is a very perfect, but very diminutive, forest growth of birch and willow. Poppies, anemones, buttercups, and other bright colored flowers bloom in favored localities, and butterflies and mosquitoes are abundant.

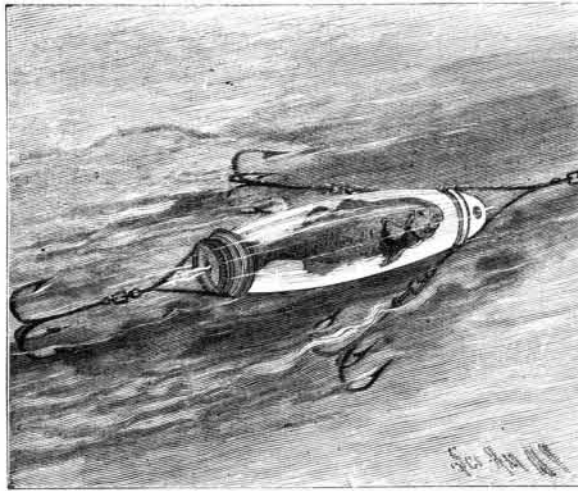
The country, up to the 73°, belongs to Denmark; north of that is No Man's Land, probably because its resources have not made it worth an official claim and protection.

The true Esquimaux are found north of Melville Bay, and now number approximately 250. They seemingly observe no religious forms whatever; they live largely upon uncooked food, are quick of perception and in adapting means to ends, and are absolutely honest.

The expedition to be undertaken next season will attempt to completely locate the northern boundary of the country and to study the open sea beyond.

TROLLING WITH LIVE FISH BAIT.

The improved fishing device shown in the accompanying illustration, and which has been patented by Mr. Henry J. Welch, is designed to keep the bait used alive for an indefinite period. The hooks, instead of being attached to the line in the usual way, are white, and are secured by a swivel and white wire leaders to an annealed, flanged, flint glass tube, through which the water circulates, and in which is held a live minnow, or other living bait, the glass magnifying the size of the fish in the tube, and its effect being such that, at a distance of a foot, only the bait fish in the tube is seen by the fish in the water outside, the hooks escaping observation. An opening in the front of the tube and one in the cap closing its rear provides for a free circulation of water through it, so that one small bait fish may last for a day, the fish being inserted in the tube by unscrewing the rear cap. It is said that this



AN IMPROVED TROLLING DEVICE.

device has been successfully employed in catching muskallonge, pickerel, pike, and bass, being equally adapted for taking either salt or fresh water game fish, whose natural bait consists of small fish.

The tubes are preferably made of different sizes, from 3½ to 5½ inches long, and proportionately trimmed with hooks, according to the kind of fish it is proposed to catch. Further information relative to this improvement may be obtained of Mr. Calvin V. Graves, Natural Bridge, N. Y.

Plaster of Paris Floors.

The French, who have carried the art of hardening plaster to where it is utilized for flooring, either in place of wood or tile, use six parts of good quality of plaster intimately mixed with one part of freshly slaked white lime finely sifted. The mixture is then laid down as quickly as possible, care being taken that the trowel is not used on it for too long a time. The floor, adds the *National Builder*, should then be allowed to become very dry, and afterward be thoroughly saturated with sulphate of iron or zinc, the iron giving the strongest surface, the resistance to breaking being twenty times the strength of ordinary plaster. With sulphate of zinc the floor remains white, but when iron is used it becomes the color of rusted iron; but if linseed oil, boiled with litharge, be applied to the surface, it becomes of a beautiful mahogany color. Especially is this the case if a coat of opal varnish is added.

Paste for Attaching Paper to Glass.

- Flour 2 teaspoonfuls.
- Water 4 ounces.
- Bichromate of potash 5 grains.

The flour must be rubbed to a smooth paste with the water, then placed in a saucepan over the fire and kept stirred until it boils. Add the bichromate slowly, stirring all the time; then stand to cool. The paste must be kept in the dark, and used as soon as possible. Soak the paper in it, and attach to the glass, then place in direct sunlight for a day. This sets up a chemical change in the bichromate, and renders the paste insoluble.

Correspondence.

Nitro-Glycerine Should be Kept from Freezing.

To the Editor of the Scientific American:

How long will the community be startled and appalled by such terrible calamities as occurred recently in a Brooklyn suburb? I answer, just as long as workmen are allowed to thaw out dynamite. "But it can't be used in its frozen state." No; but it can be kept from freezing, just as easily as ink, or vegetables, or anything else. Dynamite, in cold weather, should be kept in a chest impervious to frost; and any box or chest can easily be made impervious by packing. The legislature of every State where the mercury is liable to fall below freezing should enact a law making it a criminal offense on the part of any one storing or using dynamite to allow it to freeze. J. T. PETTEE.
Meriden, Conn., January 2, 1893.

American vs. Foreign Files.

To the Editor of the Scientific American:

I have read Mr. J. D. Foot's answer, in the SCIENTIFIC AMERICAN of January 14, to my note on files. I desire to say that my experience with file manufacture is quite small and unimportant; but my experience in the use of files is one of thirty years. This experience teaches me that the files made by Mr. Foot's company are inferior to those of the Stubb's make in at least the degree stated in the note referred to.

It is fair also to assume that Mr. Foot has incorporated his whole file knowledge into his product, and those who are familiar with that product may judge said experience and expertness with little room for doubt, and they may thus gauge his criticism of my note so as to do justice to both of us.

A general expression of the opinions of American users of files on the values of Mr. Foot's files, when compared with the Stubb's files, will teach your readers how these tools generally are considered.

Brooklyn, Jan. 16, 1893. ALBERT D. PENTZ.

The Importance of Auxiliary Water Jet Propulsion for Steamers.

To the Editor of the Scientific American:

Your valuable article on "Safety Suggestions on Ocean Steamers," of January 7, 1893, is very timely and to the point. It should be well pondered and carefully considered by the engineering profession and by the public.

When it is considered that thousands of human lives and millions of dollars of property are risked on the ocean every year, thousands of miles from land, it is a wonder to me that not more precautions are taken to protect life and property, and that not more progress has been made by marine engineers to make steamships superior to wind and water. It seems to me man will master the sea when he will perfect his steamship. He has not done it yet; but if an auxiliary propelling force like water jets were introduced, it would go a long way to make safe and perfected steamships, by giving the vessels a steering and propelling power independent of the screw and shafts. If jets were used with the screw, they would produce increased speed to the vessel; but as a ready protection to a vessel disabled on account of loss of screw or fractured screw shaft, the water jet offers the least expensive and most effectual of any means taken to provide safety for a vessel in such an emergency. With a water jet propeller the vessel is reasonably sure of steering and propelling itself to port, and need not depend on the "hawser" and pay heavy salvage. Then collisions will be less frequent, because bow jets enable the vessel to stop much quicker, and if the government put jets on war vessels, it would find it could maneuver war vessels with jets to a much greater degree than is now the case.

The government should carefully consider the merits of the auxiliary water jet, and if it finds it will protect life and prove valuable in case of loss of the screw or broken screw shafts, then it is the duty of government to enact a law that all steamers and war vessels be provided with the auxiliary method of hydraulic propulsion.

There is no question that water jets will propel a vessel; and as the SCIENTIFIC AMERICAN suggested—by use of the pumps in the ship—an inexpensive means would be at hand to provide a propelling force in case of necessity. Then, no doubt, if the system were adopted it could be greatly improved, and obstacles that now appear could be surmounted. I hope the matter will be taken up, now that you have called attention to the importance of auxiliary water jet propulsion. J. W. H.

Newton, Mass., January 9, 1893.

NICKEL is a modern metal. It was not in use nor known of till 1715. It has now largely taken the place of silver in plated ware, and as an alloy with steel it is superior to any other metal, for it is not only non-corrodible itself, but it transfers the same quality to steel; even when combined as low as 5 per cent it prevents oxidation.

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 forefeet, 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 acrobaticism displayed by cats in their rambles over roofs and fences. But the third act depicted by our artist shows 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.

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

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.

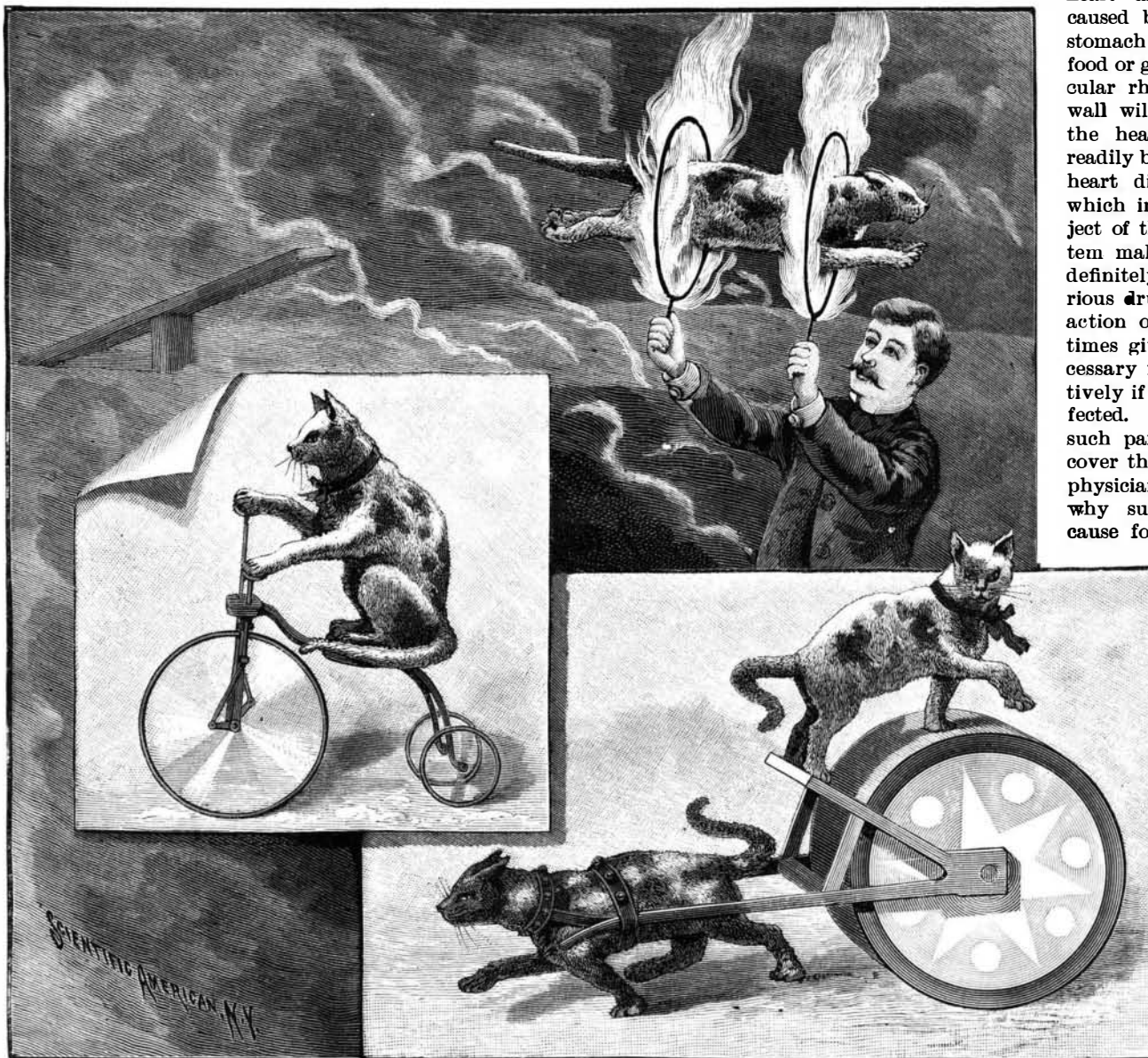
Pains in the region of the heart, says a writer in the *New York Ledger*, are common, and the general dread of this disease makes many people imagine that they have heart disease when there is any local affection in this region. Many who think they are suffering from

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.



PERFORMING CATS.

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