HAT HOLDER FOR TRAVELERS.

This hat holder is designed to be temporarily adjusted for use by travelers in railroad cars and other public conveyances. The device as shown in Fig. 1 is made of a continuous piece of wire bent to the form indicated. The free ends of the spring arms are bent toward each other, and pointed to enable the device to be readily secured to a moulding or other projection, by a slight pressure of the fingers. Passing through the spiral portions of the wire is a cross bar, which lends stability to the device and acts to steady it when fastened in position ready for use. The enlarged ends of the cross bar prevent it from being freed from the holder. The wire used is not very heavy, but possesses sufficient strength to allow the loop to be borne down to a suitable angle by the weight of the average hat. The spring action of the spirals is sufficient to return the loop to its normal position upon the removal of the hat. In Figs. 2 and 3 are shown modified forms, in which the spring arms and loop portions are made of separate wires bent to the shapes clearly indicated in the drawings.

This device, which is the invention of Mr. William H. Atwood, of Kinderhook, N. Y., forms a very reliable and convenient hat holder, which is especially useful for travelers, as it may be easily carried in the pocket when not in use. It is also well adapted for temporary use in theaters, restaurants, etc.

The Skeleton Industry in France.

A correspondent of the *Medical Press*, of London, communicates to that journal the following account of a skeleton manufactory which he recently had an opportunity of visiting. The establishment is located in the plain of St. Denis, France, and consists of large wooden buildings, comprising one main structure and several annexes.

The large hall contains two rows of immense kettles, the emanations from which are, as might be supposed, far from agreeable, even to an olfactory apparatus used to the atmosphere of a dissecting room. These kettles serve for ridding the bones of their adhering tendons, through boiling. The disarticulation of the skulls, which is performed separately, constitutes the most delicate part of the operation. In the case of children or young adults, it is effected through an ingenious process consisting in filling the cerebral cavity with dry peas, and then immersing the skull in water. Through the effect of such immersion, the peas swell and bring about a dislocation of the most delicate sutures.

A certain number of the kettles are reserved for carcasses of animals designed to furnish skeletons of a lower price than the human ones, but indispensable for the study of natural history, and forming an important article of Parisian export.

After the bones have been submitted to a prolonged boiling, they are carried to tables, where young women carefully scrape them, in order to free them perfectly from the soft tissues that adhere to them. Certain specialists obtain very high wages for this work, especially those who prepare very delicate bones, such as those of frogs, lizards, etc.

The fat that swims on the surface in the kettles is skimmed off with care, and put into a special vessel in one corner of the hall. What is its destination? That is a mystery.

After being scraped, the bones are bleached, either through the action of chloride of lime, for cheap skeletons, or that of the sun for high-priced ones. Finally, they go to a special work room, where they are assembled, mounted upon brass, and articulated.

These final operations require a profound knowledge of osteology, along with an artistic eye. In fact, it is necessary to select, from a collection of all sorts of bones, those that can be well enough assembled to look as if they came from one and the same individual. The others are sold singly, for the use of students of limited means, who are content with a portion of an unmounted skeleton. It is curious to find that sex has a great influence on the market value of the bones, a beautiful female skeleton being usually worth 20 or 25 per cent more than a male one of corresponding quality.

Special kettles are devoted to children, from those of the most rudimentary age up to those of two or three years. These skeletons are arranged in show cases, in ascending series, from the miniature three or four inches in height up to the baby of twenty or thirty inches. These little skeletons have proportionally a greater value than those of their adult brothers.

It may naturally be asked whence all the cadavers come. Most of them, it appears, are furnished by the hospitals and dissecting rooms, and others by the prisons. As a general thing, the supply has been less than the demand, but in recent times the abundance and cheapness of skeletons of Austrian origin have considerably depressed the market. Nevertheless, despite the industrial and commercial crisis that prevails throughout the world, the industry under consideration seems to be in a most flourishing condition.

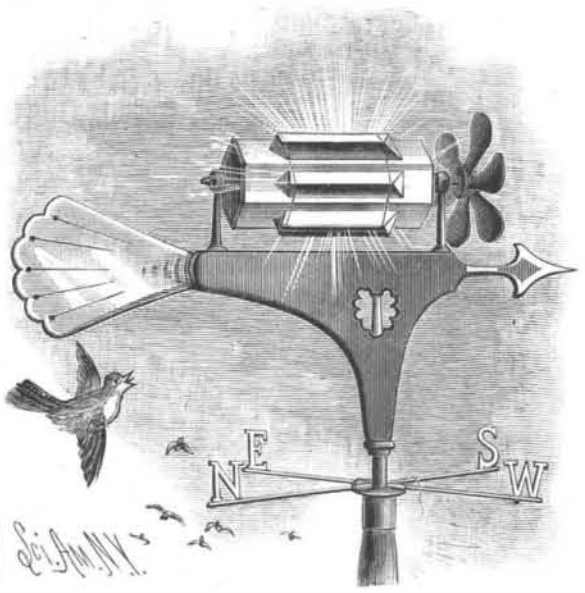
Water Back Explosions.

During the past winter quite a number of accidents have been reported from the bursting and explosion of the water backs to ranges. Among a number of remedies suggested for obviating such occurrences, the following, by a correspondent in the *American Architect*, possesses novelty, and may answer the purpose required of it.

The device consists of an air chamber made of corrugated sheet iron, placed inside of the water-back; when the water freezes, it will expand 0·089 of its bulk; and as the compressibility of air exceeds this by far, an air chamber of, say, one by two inches, in an ordinary size water back, will accomplish the object, and danger of bursting or exploding is averted, either from the expansion of ice or pressure of steam; to make sure, I have added a device in the shape of a plug placed in the top of the water back, held in its place by a spring, which will allow the plug to rise up under a certain pressure of steam, thus acting as a safety valve; when, then, the connections between the water back and boiler are made with lead pipe, instead of iron pipe, the writer adds, all danger of bursting or exploding is averted.

A NOVEL WEATHER VANE.

A decided departure from the ordinary type of weather vane may be secured very simply by following the construction shown in the accompanying engraving. A hexagonal barrel, with sides of mirrors, is mounted on its axis as shown, and a propeller or helix is connected with it at one end, whereby a rotary



REYNOLDS' NOVEL WEATHER VANE.

motion is imparted to the barrel by the action of the wind. Prisms are wired to the sides of the mirrors, which give to the rays a rainbow-like hue which is dazzling in the extreme. This contrivance has been devised by Mr. R. B. Reynolds, of Stockport, N. Y., and it possesses a novelty which will commend it to the attention of those seeking something quite unique in this line.

Mechanical Foolhardiness.

Carelessness kills more mechanics than old age or disease, and the number of accidents resulting from somebody's carelessness cannot be estimated. There is not as much danger in doing risky jobs and undertakings as there is in the every day risks which are met with a contempt brought about by a long acquaintance therewith, and which are hardly regarded as risks by the men who take them. The architect takes risks which are needless when he guesses at the strain to be overcome by beam or truss, and also, and doubly so, when he also guesses at the strength of that beam or truss. The builder in turn takes a risk when he passes defective construction with the guess and the hope that "'twill hold." In driving piling for a block of houses in Harlem, the writer noticed that some of the piles were driven 12 to 20 inches by the last blow of the hammer, and he wondered at the risk taken by the builder for the sake of saving a few dollars thereby. In building a railroad bridge in New Hampshire, the contractors put down piling where the last blow drove some piles 4 feet! In this case some piles were driven too far, whereupon the risky, rascally contractors laid hold of said piles and pulled them up again until they were in the required position.

In erecting buildings, hundreds of risks are taken by the workmen themselves, by the owners, and by the builders also. In erecting machinery, the risks continue to be taken, and after the machinery is running it seems almost as if the attendants vied with each other in courting danger. Begin with the fireman. How many times will he risk his life by guessing that the safety valve is in perfect order, or that the combination water gauge pipe is not plugged up! All too often he will guess that his boiler is safe, and run with dirt, leaks, corrosion, and he knows not what else, in that straining and groaning iron shell under which he shovels coal. Why is all this, we may well ask? Is the man a lunatic? Is the man a fool, or what is the matter with him? There are just two other causes which may affect his behavior, for he may be lazy or avaricious; then in this latter case he is a villain as well. The architect was lazy; he didn't figure because it was easier to guess. The builder who drove the piling was a knave. He did thus in order to make more money out of the job; but the workmen who got maimed or killed, the fireman who lets his safety valve get stuck, he is sometimes a fool, but more often these things happen through pure laziness, and laziness alone. The engineer who almost hourly exposes himself by walking under the expand belt from his engine, this man is lazy; but he is abetted in his laziness by knavery, in shape of an avaricious owner, who grudges the few dollars necessary to box up the dangerous place, and thus relieve the lazy man's temptation.

Lazy men run all sorts of risks in putting on belts, in fooling around moving machinery and in monkeying with running tools, such as circular saws, planers, and moulders. The man who crawls around exposed machinery to oil or clean the same, when he can just as well stop the machine before exposing himself, this man deserves to be sent up for ten days for every offense. Only a few days since, a party of masons were building a 100 foot mill chimney. They had got up 18 feet, when all at once the whole party thought an earthquake had come to help them. They were all on the ground among bricks, mortar, and splintered lumber, with two of their number seriously hurt. An examination showed that in nailing on the last course of ledgers, only one nail had been put into some of the posts where six should have been driven. Here was a clear case of laziness and foolishness combined, with the poor consolation—to the victims at least—of knowing that only themselves were to blame. Sometimes this carelessness becomes criminal, and is occasionally brought to justice; and lately, where knavery is the cause of accident, it has been frequently severely punished. There is no excuse for exposure to such accidents, and every man can educate himself out of it if he will.

Familiarity is one great cause of a man getting careless and lazy. He works around machinery so long without accident that he thinks, if he thinks at all about it, that he knows all the ins and outs, all the dangerous places and death traps, so he will not have to be so continually on his guard. It is a good deal of work to keep his thoughts on his fingers all the time, so our man gets a little lazy, goes too near a quick running belt, and the first thing we know he is a subject for the surgeon or undertaker. Well, the writer remembers a man who was set at work running a circular saw. This man was mortally afraid of the saw, and kept as far from it as possible. For twenty-three years the saw was operated by this man without accident, until one day he dropped his rule beside the saw, and attempted to pick it up without going back to the table. He got three fingers and his thumb cut off, all through a little laziness in not taking proper pains against accident.—*J. F. Hobart, in the Boston Journal of Commerce.*

Poisoning by Locust Tree Bark.

The inner bark of the fragrant flowered locust (*Robinia pseudacacia*), commonly cultivated as an ornamental tree and for its invaluable timber, has long been known to have a sweetish taste resembling that of licorice, and to have emetic and cathartic properties.

In the *New York Medical Journal* of January 22, Dr. Z. T. Emery reports a case of poisoning of thirty-two boys at the Brooklyn Orphan Asylum, from chewing some of this bark, which they had obtained from the yard, where fence posts had been stripped.

In the mildest cases, vomiting of ropy mucus was observed, together with flushed face, dryness of throat, and dilated pupils. In the severest cases, large quantities of ropy mucus mixed with blood were vomited. The other symptoms were retching, pain in the epigastrium, debility, stupor, cold and pulseless extremities, a feeble and intermittent action of the heart, dilated pupils, and face of a dusky pallor.

The patients were given subcarbonate of bismuth and brandy by the mouth, and morphine hypodermically; sinapisms were applied over the stomach, and bottles of hot water along the extremities. The patients were discharged from the hospital in two days.

ALUMINUM STEEL.—The Cowles Electric Smelting and Aluminum Company, of Cleveland, O., are now exhibiting what they call aluminum steel. In a sample bar of iron welded to a bar of Siemens-Martin basic steel with one-fifth of 1 per cent of aluminum added, no line of weld can be seen, the characteristics of the steel appearing to extend far into the iron. Without the aluminum, a clearly defined weld is visible between iron and the same steel. The same firm show a forged bar of aluminum bronze, with 5 per cent of aluminum. This broke at 36 tons per square inch of original section, with 60 per cent elongation.

Analyzing the Air.

We learn from the *Sanitary World*, London, that an analysis is about to be made of the air in the schools, public halls, theaters, and some of the churches of Edinburgh. In several cities, both on the Continent and in Britain, the custodians of the public health have had the air of places of public resort analyzed; and now through the efforts of Dr. Russell, the convener of the Public Health Committee, the same is being done for Edinburgh. The first examination was made in the rooms of the council chamber recently. The apparatus used in the process is contained in a large box. Three different sets of apparatus are employed—one for testing for carbonic acid gas, a second for germs, and the third for organic matter. In connection with the analysis for carbonic acid, the air is pumped by a bellows into bottles with a capacity of a gallon and a half, the air from different heights being obtained by means of an adjustable India rubber tube. In the analytical process a solution of baryta is used. This poured into the bottles containing the air absorbs the carbonic acid, and forms a white powder at the bottom of the vessel. A given quantity of baryta being capable of absorbing a given quantity of carbonic acid gas, the measurement of the baryta remaining in solution in the bottle gives, on a simple calculation, the quantity of carbonic acid gas which was in the amount of air sampled. For the collection of those mysterious germs which are never entirely absent from the atmosphere, and whose functions have not yet been satisfactorily determined, a glass tube about 2 inches in diameter and 2½ feet in length is used. This, coated internally with a transparent gelatine, in which the germs can live and thrive, is brought to the place the air of which is to be tested, germ free. A reversing aspirator is affixed to it, and a measured quantity of air is then drawn through the tube, on the sides of which the germs deposit themselves. At first these are not distinguishable by the naked eye; but in the course of three or four days they have formed colonies and multiplied so exceedingly that a glass is no longer needed to pick them out. Ultimately they are subjected to examination under high microscopic power, so as to determine, if possible, their genera, and whether or not they are disease-producing germs. They are mostly vegetable, and belong to the very lowest order of things endowed with life. For determining the amount of organic matter, the apparatus used consists of a set of six bottles filled with the purest distilled water, and connected together by means of tubes. The aspirator is put on to one end, and the air is then sucked into the bottles drop by drop, and thoroughly washed in its passage through them. No perceptible discoloration of the water ensues by this washing of the air, but the water acquires a stuffy, disagreeable smell, the same as is experienced in a badly ventilated chamber. The water thus impregnated with organic matter is then emptied into a vessel for analysis. These investigations are being made by Dr. Hunter Stewart, who directs under Sir Douglas Maclagan the Public Health Laboratory in the University, and by Mr. Cosmo Burton, B.Sc., well known as an analytical chemist.

The New Steel Gun.

The army ordnance officials are quite jubilant over the results obtained last week at Sandy Hook with the new 8-inch steel gun, which was recently hooped to the muzzle after having been fired successfully 24 rounds. Since the rehooping, the gun has been fired 19 rounds, making 43 rounds in all. The ordnance officers who witnessed the trial report that during the last firings the gun, with a powder charge of 110 lb. and a 289 lb. shot, gave the following results: Initial velocity, 1,878 ft.; pressure, 36,000 lb. per square in.; energy, 7,066 ft. tons. With a 302 lb. shot, the powder charge and density of loading being the same, the results produced were: Velocity, 1,857 feet per second; pressure, 37,000 lb. per square inch; and energy, 72·19 foot tons, which is equivalent to an energy of a shot of 289 lb. weight with a velocity of 1,898 feet per second. These results are considered equal to those given by the Krupp 8¼ inch gun, and considerably in advance of anything produced by guns of similar dimensions. Still better results are anticipated with improved powder. The gun went through the last firings without a blemish, the breech mechanism (the De Bange system) working admirably. —*Army and Navy Jour.*

Transparency of Molten Iron.

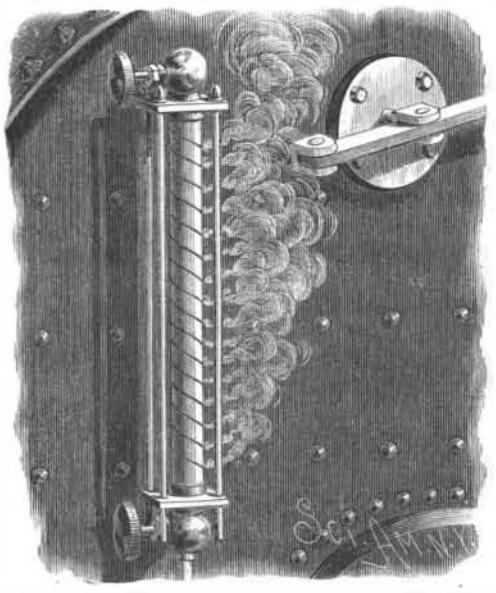
A correspondent of the *Chemical News* says: Some days ago I was present when a casting was made involving the pouring of several tons of molten cast iron. The stream was very regular, and resembled a great waterfall. It was possible to see objects through the molten metal, which appeared to be of a yellowish color, but tolerably transparent. Two gentlemen who were present were also convinced of the transparency of the metal. May I ask, through your columns, the opinion of those who have frequent opportunities of being present during the operation of casting, regarding this seeming transparency?

Correspondence.

CURIOUS ACCIDENT TO A WATER GAUGE OF A LOCOMOTIVE.

To the Editor of the Scientific American:

I inclose you photograph of water gauge glass which was cut while in service, in the spiral form shown, the steam and water escaping through the cut. Engineer H. Bokeloh, of engine 19, C., I., St. L. & C. Railroad, tells the following story: December 15, 1886, I had occasion to take the glass from its sockets while under steam, replacing it upside down. As soon as steam was turned on, opening lower waste cock, a small particle of something passed through, cutting the glass and escaping through the cock with the waste steam. I could not find what it was. When the cock was closed, the water and steam escaped through the whole length of spiral. It is considered a great curiosity here; many veteran engineers have "given it up," and say they can give no solution to the mystery. The glass is kept, with a photograph of same, in Master Mechanic Patterson's office, Cincinnati, where it is daily inspected by many engineers.



GEORGE B. HAVENS.

Indianapolis, Ind., January 24, 1887.

[It is well known among dealers that many of the Scotch water gauge glasses are under internal strain from deficient annealing. The least scratch will cut them like a diamond. They sometimes split after being cleaned with cotton waste on a wire or small iron rod, the contact of the wire or rod causing fracture. The point of a small file run around on the inside cuts as clean as a diamond. In the case of the spiral cutting written of by our correspondent, and represented in the accompanying engraving, the steam or water, in entering the tube, takes a spiral movement from some peculiarity in the opening in the cock or valve, as is often observed. Any scale or hard substance entering with the steam or water will partake of the whirling motion of the steam or water as it progresses through the tube. If the scale by its gravity acquires a centrifugal force that throws it against the tube and keeps it there, through the whole course of the spiral movement of the steam or water, this may be sufficient to cut the spiral track shown in the engraving, which is a careful copy of a photograph of the glass itself.—ED.]

Exposure as a Preservative of Health.

To the Editor of the Scientific American:

In the army we had for tents rectangular pieces of canvas four feet square, two of which, joined at the edge, and supported upon sticks in the form of a V-roof, formed a shelter for the night. Under these we slept on blankets placed upon the ground, and such perfect, strength-renewing, and invigorating sleep I never experienced before nor since. A mere canopy over us, with the winds blowing across our faces during the night at their own sweet will. I scarcely knew then what it was to have a cold. I have been filled with astonishment at times, when realizing what exposures I endured without the least inconvenience as to health.

I have lain upon blankets upon frozen ground at night, and awakened in the morning to find the blankets wet from the mud beneath me, caused by the ground thawing from the heat I had furnished during the night. I have repeatedly, at the close of a long, tedious march, lasting until late in the evening, lain down by the side of a fence in clothes wet with perspiration, with boots for a pillow, and without covering, and slept refreshingly, to wake in the morning in rain that had been falling I knew not how long. Under such extreme exposures I would sometimes arise with a slight hoarseness—nothing more—which would disappear before noon. My experience was not different from that of others around me, and how any of us passed through these things and lived twenty-four hours thereafter has never ceased to be a mystery to me. A person worn and exhausted from hard labor is peculiarly fitted to become the victim of colds and rheumatism, if exposed to dampness and chilly air, and yet these were the very conditions under which we, at the end of a laborious march, would seek the comfort the ground gave us, too weary to give much thought to the matter of protection. Troublesome chilblains that had afflicted me since childhood entirely disappeared. War life will, I believe, kill one man out of twenty and make robust, healthy men of the other nineteen.

After our discharge, the first night's sleep in a house found us suffering from colds, in some cases truly severe, and I have always believed since my army experience that man, as an animal, has no business in-doors, where health-destroying draughts are creeping along the floors and walls. The recent correspondence in the SCIENTIFIC AMERICAN on this subject has brought vividly to mind my army experience.

E. B. WHITMORE.

Rochester, N. Y., March 24, 1887.

Rotation of a Solid within a Fluid.

To the Editor of the Scientific American:

The account of Rougerie's "Anemogene," which you have republished from *Engineering*, is interesting as a device for illustrating the effect of centrifugal force due to rotation of a solid within a fluid; but M. Rougerie's idea that the rotation of the earth is an important factor in giving rise to the great currents at its surface is by no means new. The statement in the article is, "We must bear in mind that the ordinary assumption explains these as arising from differences in barometric pressure due to differences in temperature, while M. Rougerie bases his theory on differences in air pressure directly due to the rotation." This seems to imply that his theory is deemed a new one.

Professor William Ferrel, who was connected for many years with the United States Coast Survey, and then with our national weather bureau, from which he withdrew on account of ill health only a few months ago, was the first to apply to meteorology the principle that M. Rougerie illustrates now so ingeniously. His paper on "The Motions of Fluids and Solids on the Earth's Surface" was published in *Runkle's Mathematical Monthly* during the years 1858 to 1860, the general course of reasoning employed by him having been first given in a popular article, published in 1856, in the *Nashville Journal of Medicine and Surgery*. It was reprinted in 1882 as No. VIII. of the professional papers of the United States Signal Service. It bristles with mathematical equations, and probably on this account the results attained by him have not found their way into the popular text-books. Professor Guyot was probably familiar with them, but did not undertake to popularize them in his school text-book of physical geography, which is largely used in this country. In all of the text-books on this subject, the rotation of the earth is taken into account in explaining the westward tendency imposed upon the fluids at the earth's surface in equatorial regions, and the eastward tendency as they return toward the poles, this deflection being from motion in a north and south line.

Professor Ferrel showed that "*in whatever direction* a body moves on the surface of the earth, there is a force arising from the earth's rotation which deflects it to the right in the northern hemisphere, but toward the left in the southern." The usual explanation of the trade winds is an application of only a part of Ferrel's law. This law includes what M. Rougerie illustrates with his anemogene. It is the foundation for the explanation of not only the trade and anti-trade winds, but of the currents of the ocean and of the spiral motion of the air in cyclones. The fact of such spiral motion is always mentioned in the school text-books, but there is usually very little in the way of explanation of this or of their approximately parabolic path.

In the article about M. Rougerie, it is stated that "somewhat fancifully he assumes, in analogy with the rings of Saturn and the belts observed on Jupiter, that our atmosphere extends to a greater height at the equator than at the poles, so that the earth should carry with it a sort of atmospheric ring." This "fancy" was, thirty years ago, developed mathematically by Professor Ferrel, whose conclusion that the poles must be regions of relatively low barometric pressure has been verified by subsequent observation, as may be seen by examining any recent isobaric chart of the world. The truth is not that Wojeikof's observations are explained by Rougerie's subsequent theory, but that they were preceded by Ferrel's general demonstration.

Important as the earth's rotation is in determining the fluid currents at its surface, its effects are so bound up with those due to the sun's heat that no separation is possible. Nor can we ever decide whether Rougerie is right in according to the sun's rays "only the second place."

M. Rougerie is not alone in having constructed a model to show the effect of rotation, along with continental interference, in producing currents that circulate somewhat irregularly over the earth's surface. As far back as 1866, I saw one in which the fact was satisfactorily demonstrated. W. LE CONTE STEVENS.

Brooklyn, March 24, 1887.