The Decay of Westminster Abbey.

The atmosphere of London has played havoc with the stone in this famous building, and although the interior is in good condition, beneath the coating of grime and dirt with which long ages have covered the structure, and which conceals the decay from the eye of the casual observer, there has been long going on a process of decomposition which, if not arrested, will speedily cause ruin. The London *Times* states that in 1882 a well known architect examined and reported upon the condition of the Abbey. The wall surfaces round the clear story windows, wherever the fire stone has been allowed to remain, have become very seriously decayed, the decay in some places penetrating to a depth of seven or eight inches, "so that the architect is surprised that the heavy cornices and parapets should have found a sufficient support in so ruinous a wall." Before the report was made, in some of the worst places in the nave, the superstructure had been removed and the face of the wall rebuilt; but the architect was of the opinion that "immediate and very extensive repairs and restorations were urgently needed for the whole of the masonry of these clear stories." The conclusion was the same regarding the flying buttresses supporting the clear story walls, which in some places are dangerous and in others so decayed that pieces of stone are constantly falling from them upon the lead roofs. In regard to the south side of the nave, over the cloister roof, the report says:

"Large pieces of stone are continually falling, being detached by the rusting of the iron clamps with which the masonry was thoughtlessly put together. Very considerable damage has from this cause been done to the western towers, the whole surface of which is disfigured by the bursting off of triangular and other shaped pieces of stone; these heavy pieces fall not infrequently, and do much damage."

The transept on the south side has been recently restored, and the porch of the north transept is also new, but above the porch the masonry is in places very loose and unsafe, and demands complete and extensive repairs. The stone of the clear story of Henry VII.'s chapel, of the flying buttresses, and of the pinnacles is also badly decayed.

It is estimated that the cost of the restorations will be from £60,000 to £80,000, and the *Times* asks the pertinent question: "By what means may future generations be spared the periodical scandal of discovering that this great historical church has fallen into decay?" Judging from the rapid rate at which disintegration is now going on upon some of the buildings in this city, it will be but a few years before the above question may be applied to many of our finest edifices.

To Prevent Railroad Accidents.

Railroad spikes pull out of ties by the spring of the rails under the weight and pressure of engines and trains. The spreading of rails, for this reason, is one of the principal causes of railroad accidents. General Manager F. K. Hain is putting in "interlocking bolts" on the curves, switches, and frogs of the elevated roads, where the greatest danger is encountered, as a protection against accidents. These are the device of Capt. Thomes J. Bush, of Lexington, Ky., and are without heads. They are put in from the upper side of the tie. Holes are bored vertically on either side of the rail in the places where the spikes would go. They cross under the rail, forming the letter X. The bolts have threads turned on the upper ends, which are bent so as to cause the nuts, when the bolts are inserted at angles, to come squarely down on the flange of the rail. A slot is cut in the side of one bolt, which is inserted first. The side of the other bolt is beveled up to a point where a notch is cut on the under side to come squarely against the shoulder and in the slot of the first bolt, and in that way the two lock. The nuts are then screwed down, and the rail is held as if in a vise. The pressure against the side of the rail, tending to turn it over, is resisted by the lower part of the X-like adjustment of the bolts, and nothing but the tearing out of the solid wood will release the rail. The device is expected to greatly deaden the sound, and in case a rail should break it would still be held in place. A number of roads are experimenting with the bolts, among them the New York Central, the Pennsylvania, the Erie, the West Shore, and the New York City and Northern, and Elevated Railroad.

Glue, Paste, or Mucilage.

Lehner publishes the following formula for making a liquid paste or glue from starch and acid. Place 5 pounds of potato starch in 6 pounds (3 quarts) of water, and add one-quarter pound of pure nitric acid. Keep it in a warm place, stirring frequently for 48 hours. Then boil the mixture until it forms a thick and translucent substance. Dilute with water, if necessary, and filter through a thick cloth.

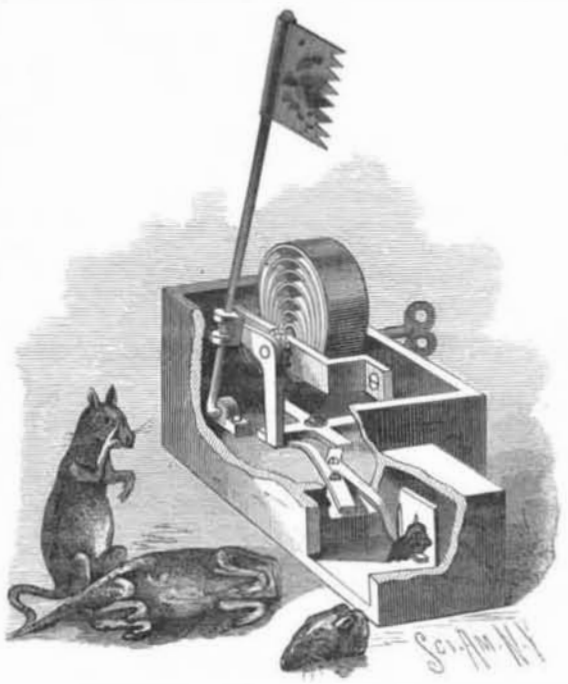
At the same time another paste is made from sugar and gum arabic. Dissolve 5 pounds gum arabic and 1 pound sugar in 5 pounds of water, and add 1 ounce of nitric acid and heat to boiling. Then mix the above with the starch paste. The resultant paste is liquid, does not mould, and dries on paper with a gloss.

It is useful for labels, wrappers, and fine bookbinder's use.

Dry pocket glue is made from 12 parts of glue and 5 parts of sugar. The glue is boiled until entirely dissolved, the sugar dissolved in the hot glue, and the mass evaporated until it hardens on cooling. The hard substance dissolves rapidly in lukewarm water, and is an excellent glue for use on paper.—*P. Notiz.*

ANIMAL TRAP.

A powerful coiled spring surrounds a shaft, on one end of which is mounted a ratchet wheel with which a pawl, pivoted on a loosely mounted elbow lever, engages. The bent end of a rod is journaled in bearings secured to the base plate in such a manner that the rod can swing in a vertical plane parallel with that of the spring. Upon the free end of the rod is a serrated knife. The rod passes loosely through the jaws of a U-shaped piece pivoted to the end of one arm of



HALL'S ANIMAL TRAP.

the elbow lever. The other end of the lever rests against one arm of a cross-shaped piece centrally pivoted to the base. A bent lever is pivoted to the base in such a manner that the arms of the cross can rest against the bent section. On the other end of the lever are a plate and two prongs for holding the bait—this end of the lever being in a separate compartment of the trap. Pressing against the side of this lever is a second one. A mouse nibbling at the bait would pull the lever forward, thereby freeing the cross-shaped piece and allowing the shaft to make a complete revolution, during which the knife would descend, decapitate the animal, and ascend to its normal position. The mechanism will continue this operation until the spring has been uncoiled.

This invention has been patented by Mr. Charles Hall, of Changewater, N. J., and further information may be obtained from Messrs. J. Hill, Jr., and V. Castner, of same place.

FIRE ESCAPE.

On a truck formed as shown in the engraving is an upright frame to which is connected, at each side near the end, a lazy tongs extension frame—one of the bars of a joint being pivoted to the frame. The other bar of the joint has a bar connected to it, which extends downward over the drum of a windlass, to which it is connected by a chain or rope. At the junction of these two bars is a friction roller that rolls along the side brace for support. The two extension frames are connected together by rods forming the pivots of each joint; to each alternate rod is connected the upper end of a short ladder, the lower end of the lowest ladder resting on the drum, and the lower ends of the others resting on the next ladder below. When a hand crank shaft, with which the drum is geared, is turned so as to wind the chains upon the drum, the extension frames will be projected upward; by unwinding the chains the frames and ladders will be lowered and folded down on the truck.

LETTON'S FIRE ESCAPE.

The bars pivoted to the upright frame are placed between disks provided with stops, to arrest the extension frames when elevated to the desired extent; when the windlass is strained up and made fast, the bars will be held firmly between the bearings thus formed, holding the frames rigidly in their working position. To the upper connecting rod of the frames is attached a pulley block and rope carrying a basket, which can be used for letting down persons or goods. Detachable braces stay the platform laterally, and pivoted bars swung down to the ground prevent the truck from rolling on the wheels. The device can be used from stationary platforms, awnings, etc.

This invention has been patented by Mr. T. P. Letton, and further particulars may be obtained by addressing Mr. F. M. Curtis, Ottawa, Kansas.

The Cost of Running a Train.

As the passenger sits at a car window and sees the mile posts whirl past, he seldom stops to reflect what it has cost the company to pull the train a mile. A party of gentlemen, some of them experienced business men, sat in the lobby of the Kennard House yesterday, when the question as to the cost of running an ordinarily heavy passenger train was raised. Several of them made estimates, but every one of them was far below the amount. The average cost of running an ordinary passenger train of from six to ten coaches is from $1 to $1.25 a mile. This may seem large at first, but when the several items are taken into account one will suspect, after all, that the estimate is too small. One of the principal items is the running of the locomotive. It has been the study of master mechanics to reduce the cost of running an engine, and each claims to be a little closer in his calculations than the other. The average cost during January of running the engines on the Bee Line, for example, was 15·77 cents per mile. Freight engines run at a cost per mile of 17·73 cents. Passenger engines cost less, viz., 17·24 cents per mile; while switch engines, which are credited with so much mileage per day, regardless of the distances run, are run at so low a cost as to reduce the average to 15·77 cents per mile. The engines ran 34·63 miles to a ton of coal, and 16·38 miles to a pint of oil.

Added to the expense of motive power is the outlay for wear and tear of cars; it is estimated that it costs 3 cents a mile to keep a sleeping car running, and the wages of train hands, etc. The expense from the item of wear and tear is increased by an increase of the speed of a train. The special trains on the Lake Shore, running at a speed of about forty miles an hour, and the fast mail, at about thirty-seven miles, are the most expensive trains on that line. It is not generally known what the Government pays the Lake Shore people for running the fast mail from New York to Chicago, but it ought to receive at least $800 to fully compensate it. Another little item of railway operation is the expense of stopping and starting a train, which an experienced railroad man said yesterday could not be effected at a less expense than from 18 to 25 cents at each stop.—*Cleveland Herald.*

Analyses of Dry Wood, and the Relation of Composition to Heat of Combustion.

Ernst Gottlieb has been investigating the elementary composition of wood dried at 115° C. (239° Fahr.), and the amount of heat that each is capable of yielding when burned. The carbon and hydrogen were determined directly by combustion, weighing the carbonic acid and water produced. The remainder, after deducting ash, represents the total oxygen and nitrogen. The actual quantity of the latter was determined only in a part of the samples.

	Oak.	Ash.	Yoke elm.	Beech	Birch	Fir.	Pine.
Carbon	50·16	49·18	48·99	49 06	48 88	50·36	50 31
Hydrogen	6·02	6·27	6·20	6·11	6·06	6·92	6·20
Oxygen }	43·45	43·98	44 31	44·17	44·67	43·39	43 08
Nitrogen }				0·09	0 10	0·05	0·04
Ash	0·37	0·57	0 50	0·57	0 29	0 28	0 37

(It will be noticed that in no case is there sufficient oxygen to combine with all the hydrogen, hence a portion of the latter must exist in the form of a hydrocarbon.)

For the determination of the heat of combustion, the author constructed a particular form of calorimeter, described in *Journal fur Prak. Chemie*, in which the wood was burned in pure oxygen gas. The operation required but three minutes.

The results were higher than those calculated by Dulong's formula for the same composition. Wood containing 49·03 per cent of carbon, 6·06 of hydrogen, gave out 4,785 calorifics, whereas the amount calculated would be 4,139, if carbon gives 8,080, and hydrogen 34,180 units of heat.