

THE TAPAYAXIN.

Mr. F. W. Fanning, of Corsicana, Texas, has forwarded us a specimen of the crowned tapayaxin or horned lizard (*phrynosoma cornutum*). This curious reptile is not uncommon in the South and in California, and is stated to be very lively when at liberty, pursuing its prey with much eagerness. In confinement, however, it becomes almost torpid, remaining for some hours in the same attitude. In spite of its formidable looks, it is perfectly harmless, and can be taught to eat flies from its owner's hand. Red ants are its favorite food; but it will eat insects of all kinds. Its general color is gray, one variety (*phrynosoma Blainvillii*) being variegated with irregular bands of brown. This animal is sometimes erroneously called the horned frog and horned toad.

Mr. Frank Buckland describes a specimen in his collection as follows: "My new friend is about the size of a common sized toad, and at a distance off looks very like one. He is covered all over with spines, some of which are larger and stronger than others; he has two fixed spines, one over each eye, and three fixed spines on each side of his face. At the top of his head are situated the two biggest spines, each about half an inch long, giving him a most diabolical appearance. All the spines are fixed firmly into his head. As will be seen by the picture, his body is covered with spines of different sizes, and set into his skin very thickly. The consistence of the spines reminds me much of the spines of the black-thorn. The color of the animal is gray, varied with brown and ochrey yellow; in fact it is very like the color of the bark of an old tree."

The tapayaxin sent us by Mr. Fanning has remained very quiescent since his arrival, hardly deigning to notice the flies placed in his box for his sustenance. He is apparently in good health, and his reticence of speech may be attributed to his philosophical temperament, and perhaps to some provincial bashfulness, natural to a new comer to the metropolis.

Lightning Conductors.

Dr. Mann lately showed, at the Science Conference at South Kensington, how unimportant is the form of lightning conductors, whether rods, ropes, or pipes; and that the real desideratum was that they should be of sufficient size to afford an unobstructed path for the passage of the electric fluid. He insisted on the necessity of a goodly number of points, and above all upon the indispensability of large earth contact, saying that a lightning discharge passing through a large rod with an ample earth contact is only a gentle stream of low tension; but that, if the size of the rod or the area of its contact with the earth is diminished, the tension is increased, and the fluid has a dangerous tendency to discharge itself laterally by chance outlets.

IMPROVED DOOR KNOB.

The chief failing of the ordinary door knob is that it works loose. Sometimes this occurs from the wood of the door not being properly seasoned, and hence shrinking, and frequently from the device itself not being secured to the woodwork as tightly as it should be. The above difficulty is claimed to be completely remedied in the improved knob illustrated in our engraving. The roses are secured to the door by little points on the underside. There is but one screw, which is attached to one of the knobs, and passes through the square rod. This is regulated, as shown, by a small catch pushed by a spring into a notch. As this notch represents an adjustment of but the one hundredth part of an inch, it is easy to see how well the knob can be made to fit. In mineral and porcelain knobs, the necks are secured by spurs going down in grooves and turning under the material of the knob.

The device is strong, easily adjusted, applied, or removed, simple and suitable for all kinds of knobs or latches. Further information may be obtained by addressing the Parker & Whipple Company, West Meriden, Conn., or 97 Chambers street, New York.

Mechanical Photo-Printing.

The following practical directions for mechanical photo-printing are from the text of Herr Husnik:

Use for the supports some plates of glass one quarter of an inch or less in thickness, roughened on one side by means of very fine emery and water, and applied by friction from another and smaller piece of glass to which a handle is attached. Do not allow the emery to become dry, or it will produce deep scratches. A circular motion should be adopted, using considerable pressure, and in about twelve minutes a very fine grain will be obtained. If plates be employed that have been previously used, remove the gelatin by immersing in a vessel containing a solution of soda. This wash keeps more than two months, and it is always possible to strengthen it by the addition of lime. The gelatin, in the case of a plate that has been previously used, will detail itself in about twelve hours. Rinse the surface and rub with emery to remove the gelatin that may have lodged in the pores; but this time one application of the emery will suffice. The glasses thus prepared are washed in several changes of water and wiped dry with clean cloths.

First: Preparation of the plates.—Take fresh albumen 25

parts, distilled water 45 parts, silicate of soda 8 parts. Mix well together, beato a froth, and allow to stand for several hours; then decant the clear part and filter it two or three times so as to ensure its being free from impurities.

In preparing the plates, place them, ground side uppermost, on a large slab of glass carefully leveled; and having brushed them over with a soft brush to remove all dust, pour a little of the preceding liquid near one edge, and cause it to flow over the surface by slightly inclining the large slab. If the liquid do not flow over the glass easily, it can be helped on by using a small slip of paper, taking care that it does not run too fast. Now raise one of the corners so as to allow the superfluous liquid to flow off the plates into a receptacle placed beneath; and if there be any air bubbles on the glass, pour some of the solution over it again while the

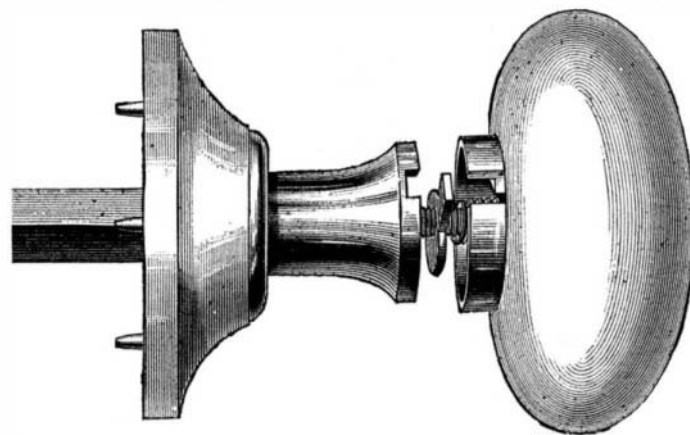


THE TAPAYAXIN OR HORNED LIZARD.

glass is in an inclined position, leaving it thus to dry. The superfluous liquid can be filtered and used again. A great number of plates may be prepared in this way and kept for about six months; but it is better not to use them on the day on which they are prepared, as they improve by keeping.

In order to coat the plates with gelatin, they ought first to be carefully washed with cold water, taking care not to injure the prepared side. Let them stand upright until dry, after which they are ready to receive the gelatin, which is done in the following manner: Provide a case with a bottom of sheet iron and a curtain for the top; and in the interior, about two and three quarter inches from the bottom, place a frame, upon which stretch calico or filtering paper, so as to diffuse and equalize the heat, which is obtained from a spirit lamp. About two and three quarter inches or so from the top, bars of iron with leveling screws are placed horizontally. A thermometer, with the bulb inside and tube and scale outside, fastened at the side, indicates the temperature of the interior. Place two, three, or more of the plates on the leveling screws, laying them in a horizontal position; shut the case and heat to 110° Fah.

During this time put 15 parts of the finest French gelatin in 300 parts of distilled water, and leave it to soak for about an hour, after which dissolve in the water bath. Next, heat to a high temperature, and add 1 part of bichromate of am-



WHIPPLE'S DOOR KNOB.

monia and 1 part chloride of calcium; when these are all dissolved, add 60 parts of ordinary alcohol, after which filter. This solution is poured upon the heated plates, and must be spread by means of a small slip of paper. Experience regulates the proper quantity to be applied, and a considerable degree of dexterity will be required; but this is easily attained. Care must be taken to prevent the layer from being either too thick or too thin. The plates thus coated are placed in the case to dry at the temperature of 110° Fah., and after being well dried, they will keep in summer for about eight days, and in winter about four weeks, in a dark place; they improve by keeping.

Exposure.—With a good negative in the shade an exposure of from fifteen to forty-five minutes will be required, according to the intensity of the light—diffused light giving the best half tints. After exposing, the bichromate not acted upon by the light is removed by being washed with water, and the plate is then well drained and dried. In about three hours it is ready to be printed from.

Printing.—The plate is attached, by means of plaster of Paris, to a lithographic stone, and submitted to the action of a lithographic press. Damp the plate and ink it with two kinds of ink, one stronger than the other. After obtaining a print the plate is moistened, wiped with a cloth, and inked.

If the details in the shadows be not properly brought out, put extra pressure on that part. One plate will furnish a considerable number of proofs, provided the instructions be carefully carried out and the gelatin be of good quality.

Final observation. This method, according to Herr Husnik's experience, is the best in use, and it gives certain results. Some photographers substitute isinglass for a portion of the gelatin, but this substance can rarely be obtained of good quality.

The choice of the inks is very important. Munich varnish ought not to be used for black, as it attacks the gelatin and the plate loses its vigor. Good black printing ink answers better when mixed with red oxide of iron, and a little César varnish imparts a good brown tint.

Utilization of Waste.

Cotton waste is a singular example of the successful application of scientific utilization. It is the collected sweepings of the card room, and formerly had no value. Large heaps were suffered to accumulate until it fermented, and was then spread over the land. After that, cartridge paper makers bought it at \$10 to \$20 per ton; then it rose in price, and means were found to bleach and tear it up, in order that it might be respun and woven, and now there is a trade of 14,000,000 cwts., giving employment to 500 dealers. The various uses are all exhibited, and the refuse is then sold for engine cleaning, and finally to the paper maker; jute is next. An immense trade has been created. It is a product of Bengal, and formerly was used only for gunny bags, to pack rags or merchandise in, but now it yields to processes which fit it for weaving with silk or cotton, or in the making of thread, ropes,

sail cloth, and with wool in flannels and carpet, and with cocoa nut fiber for matting, etc. During 25 years the consumption has risen from 391,000 cwts. to 1,250,000 cwts., and the value from \$450,000 to \$5,000,000, and the refuse now equals the original import of the raw material.

Failures—What they Teach.

The numerous failures and suspensions which have made the commercial world, since the panic of 1873, one of constant upheaval and change, should be utilized, by those fortunate ones who have thus far escaped disaster and by those who are entering, for the first time, the field of business life, for the lessons that may be drawn from them. Failures, like every species of mishap, only follow from a sufficient cause; and usually it is one that could have easily been counteracted or avoided if the fact of its existence had not been unknown. And it is just here that we find so many of our business men weak. In their acquaintance with their own business, they lack that complete command, of the calling they have professedly made themselves master of, which alone enables one to understand and avoid its dangerous points.

The man who makes a study of or who devotes time to an accurate and scientific education in the business he has chosen, as a means for the accumulation of wealth, is now rarely found; and it seems to us that a large number of the failures of the last three years might justly be attributed to this cause. The idea seems to prevail that a business transacted on one's own account is a kind of perpetual motion, that, once started, will not only keep itself in operation, but may be drawn upon to an almost unlimited extent for the means to sustain other enterprises. The inventor who spends years in attempting to realize his impossible machine is not more certain of failure than he who starts in business with such expectation. The time when money could be had almost for the taking, has faded far away into the dim past; and an era of strife and struggle has dawned, in which only those who have most carefully prepared themselves for the warfare can hope to succeed.

It is not luck that makes one man fail and his neighbor succeed; it is not fickle fortune that brings clouds of difficulties upon one while another has apparently plain sailing; it is something far more certain in its operations than either of these. It is skill and a perfect command of his resources that enables one man to advance where another can make no progress; and these two qualities are possessed only by those who have made their business the one thing they must become perfectly familiar with.

The world is not yet so crowded that any need go to the wall to support the rest; there is room for all, and an abundance to spare. The great want is for more men who are well qualified for work, and who will put their shoulders to the wheel and push. Any person who is determined to win, and who unites with his perseverance sense enough to know that success comes only to those who deserve it, by the patience and skill with which they toil, has before him an inviting field for labor, and may enter it with the assurance that, if his efforts are rightly directed, they will meet with a sure reward.—*Northwestern Lumberman.*

FILTERS for waterworks may be calculated for as follows: 1 square yard of filter for each 700 gallons in 24 hours, formed of 2 feet 6 inches fine sand, then 6 inches common sand, 6 inches shells, and lastly 2 feet 6 inches of gravel. Perforated pipes should be laid in the lowest stratum, to carry off the supply of filtered water.