NEW COTTON PICKING SHADE.

The annexed engraving scarcely requires description, as the purpose and advantages of the invention will be readily seen. Cotton picking, at best a laborious occupation, becomes irksome when conducted under a burning tropical sun; and a device which will afford to cotton pickers an efficient protection from the influence of strong sunlight and heat should receive attention. Such a device is shown in the accompanying engraving, and it must prove beneficial to both laborers and employers, for without a doubt more work can and will be done when a protection of this kind is afforded. The invention consists simply of a protective shade of cotton cloth, mounted on a light frame provided with wheels, which facilitate its movement along the rows of cotton to be picked.

This invention was recently patented by Mr. J. C. Benthall, of Schulenburg, Texas.

BENTHALL'S COTTON PICKING SHADE.

A Silver Fossil.

The *Bulletin* of the Geological Society of France describes an ammonite of silver, found in a silver mine at Caracoles, South America, by M. Fremier, who was for some time director of the mines at that place. This remarkable specimen was found with a number of other ammonites belonging to the two species *A. peramatus* and *A. plicatilis*, which had not been mineralized with silver salts. The ammonite in question, however, had been entirely replaced by chloride of silver, which had been partially reduced to the metallic condition. Light is thrown by this specimen upon the origin of the native silver which occurs in the Caracoles mines; for it is only fair to infer that this metal has, in like manner, been reduced from the state of chloride.

PUMPING SYSTEM FOR HYDRAULIC PRESSES.

There are two objections to the use of hydraulic presses as ordinarily arranged. One is, that the press works at a uniform rate of speed throughout the entire distance traveled by the platen, and therefore of necessity works slowly; the other is, that the press must be near the source of power to work to the best advantage.

The accompanying engraving represents an improved system in which these objections are not found, and which renders the hydraulic press applicable in many places where without these improvements it could not be used. It also increases the capacity by giving a greater supply of water under pressure during the early part of the operation of pressing.

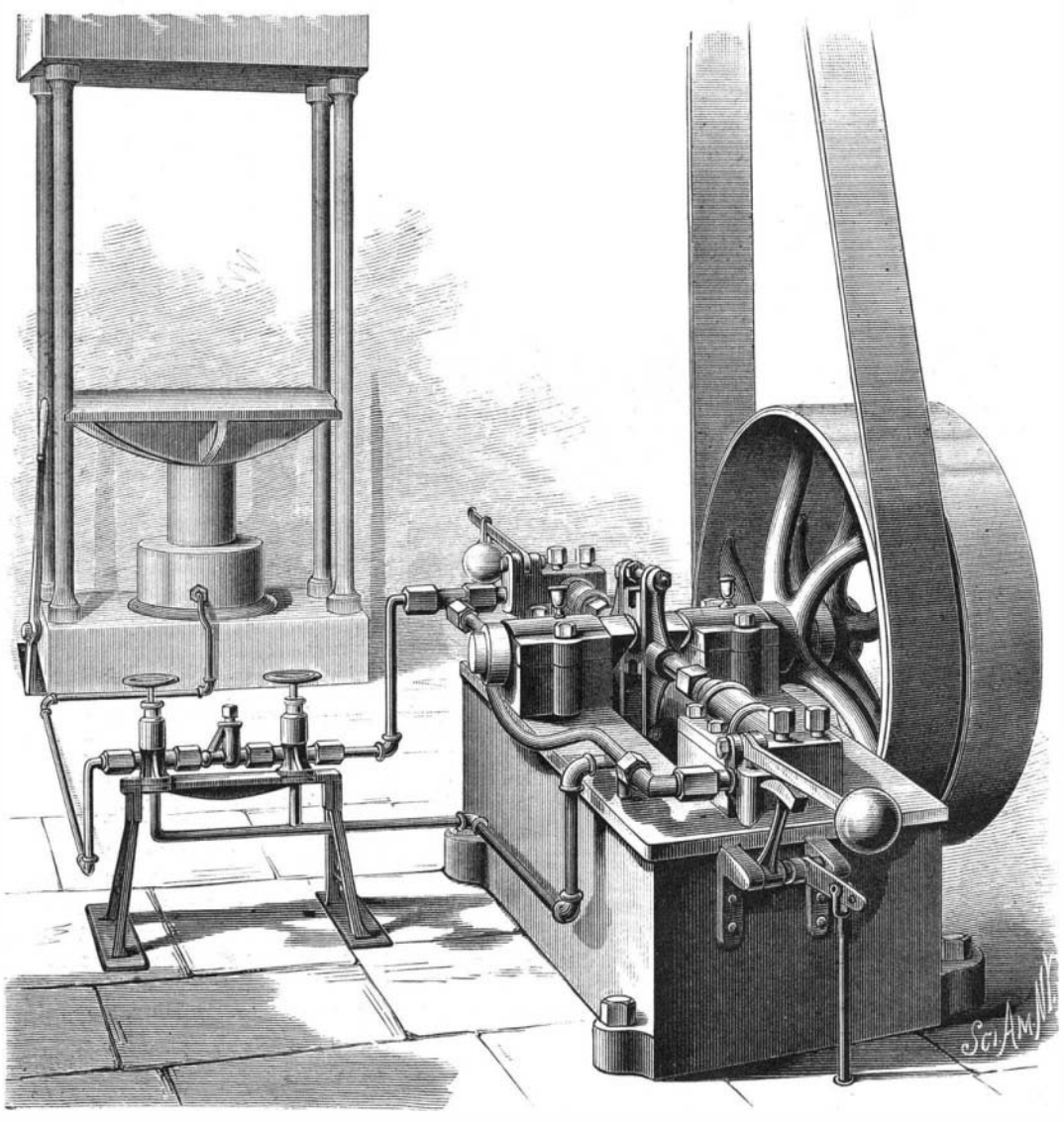
The pump shown in the engraving has two pistons, one of which is larger than the other, and designed to be applied at the beginning of the operation of pressing, to supplement the smaller one, and to accelerate the plunger of the press by forcing large quantities of water into the press cylinder. When the prescribed limit of pressure for the larger pump is reached, the pump is thrown off by means of the lever seen at the side of the press in the background. This lever is connected by bell cranks and shafts with the cam seen under the relief valve lever of the larger pump; the heavy finishing pressure is given by the smaller pump.

The valves to these pumps are of large area, and are so arranged that they may be readily taken from their seats to remove any foreign substance, or for the purpose of refitting, should it become necessary. All of the parts subjected to wear are capable of being easily "taken up," and the machine is constructed on the interchangeable plan. By employing a set of valves shown in the middle of the engraving, the pump may be placed in any convenient position, no matter how far distant from the press. The press will then be controlled by these valves, while the pump is allowed to run continuously.

Pumps are made on this plan with four or six plungers. By modifying the arrangement of the valves, several presses may be conveniently operated with a two-plunger pump.

We are informed that a large number of these pumps are in use on a great variety of work in all parts of the United States, giving good satisfaction. Many of them are in the hands of parties having little mechanical skill.

For further particulars address E. Lyon & Co., 470 Grand street, New York City.



IMPROVED PUMPING SYSTEM FOR HYDRAULIC PRESSES.

Rapid Photos.

At a recent meeting of the Edinburgh Photographic Society an interesting lecture was delivered by Mr. W. H. Davies on "Rapid Studies from Nature," during which he introduced a number of screen pictures from instantaneous photos, representing movements of life in various forms. Among the pictures thus shown were the Muybridge horse pictures, from California, heretofore shown in our paper. These photos represented the various positions of the horse's feet in the act of stepping, and were taken while the animal was going at a 2:40 gait. The lecturer, after complimenting the American photographer who took these remarkable pictures, added: "I may mention that the general speed of a fast trotting horse is about two and a half miles a minute!" Our cousins across the water are so unaccustomed to the sight of fast trotters that perhaps it is not surprising that the lecturer's statement should have been received as correct. Their ideas of the speed of American horses must have made a most rapid advance.

THE House Committee on Patents have decided to report adversely on the application for an extension of the patent on the Miller platform and coupler, on the ground that the patent has run long enough, and that the patentee has received sufficient remuneration already.

How to Get Rid of Rats in Mills and Granaries.

Millers are well aware of the terrible annoyance occasioned by rats in the mill and warehouse, and may find a useful hint in the following, from a note presented to a French industrial society, by M. Benner. The *American Miller* translates:

"Every one understands the ravages caused by rats in warehouses, storehouses, granaries, and the like. The amount of damage inflicted by these guests is appreciated by those engaged in pursuits the establishments of which suffer periodical invasions by the rodents. Their annual depredations cost millions of money. To destroy these animals, traps of all kinds have been employed and poisons of every description of undoubted deadly power. But the instinct of self-preservation in these unwelcome guests renders them inefficacious, and often injures domestic animals. Lately, one of my friends related to me the following, which took place in a large mill operated by his father. There the rats live, in a happy quiet, for the reason that the proprietor of the establishment has discovered by experience that each time he attempted to destroy them by traps or poisons, no longer contenting themselves with a diet of grain and flour, they became aggressive, and appeared to take vengeance by gnawing into the bolts and sacks in the course of a single night.

"'Like every industry which uses a water course, mine had suffered particularly from the periodical invasion of rats, which, at the approach of the rigorous season, took up their winter quarters in the warmest parts of the establishment. At this time they quit their burrows on the banks of the stream and invade the premises, gradually working up from the basement to the loft. For years I tried every means to accomplish their destruction, but to no purpose. One day when the work of repairing a wall of masonry, which supported the engine, called me below, I saw that the limestone upon which the platform of the cylinder rested had been gnawed down to the cement. This warm and dark passage had served as a retreat for the rats who raided the establishment. The idea struck me to suffocate them in their den. I took some moist chloride of lime, which I passed into each opening, and when all the rat holes were covered with paste, I sprinkled over it a small quantity of oxalic acid. The mason immediately filled up all the openings, but not before some of the rats, disturbed by the freeing of the chlorine gas, had escaped.

"'During the winter which followed, I was able to see that the rats were a little less numerous in that part of the establishment. Encouraged by this partial success, I carefully sought out the rat holes on the ground floor and went through a similar operation, with the difference that I used liquid chloride, which I poured into the rat holes until the liquid flowed back to the opening. Then I poured in hydrochloric acid diluted with water, after the earth or masonry had absorbed the greater part of the first liquid. By this mixture a violent escape of chlorine gas is produced, and the rats were invariably asphyxiated. When the operation was completed, the holes were filled up to prevent the coming of other inhabitants. That year I noticed that the rats had disappeared from the ground floor, but I could still hear them in the ceiling of the other stories. I sought all the openings by which the rats penetrated between the ceiling and the floor, and prepared pieces of sheet iron of a size sufficient to cover each hole completely. Then I placed several handfuls of cotton at the bottom of the opening in such a way as to cover the greater part of it, and dipped a piece in the moist chloride of lime and dropped it upon the first layer destined to absorb the liquid part. Then I sprinkled on some powdered oxalic acid, and alternately introduced the chloride and the acid until the entrance was filled, and then I nailed on the piece of sheet iron. This operation was gone through with in each story, and the result was complete; all the rats perished from the fumes of chlorine.

That was fifteen years ago, but whenever I discover a rat hole in the establishment I administer prompt justice with chlorine and acid.'"

Spectroscopic Notes.

Prof. H. Vogel recommends the use of a small hydrogen flame for spectroscopic work in places where there is no illuminating gas, as in the country and in some private houses. It is much hotter than alcohol, and, in fact, not inferior to the Bunsen gas burner in heat. Any form of constant generator can be employed, as the impurities in ordinary zinc and acid do not affect the spectrum. The gas is burned from a blow pipe jet, as a glass jet would yield faint spectra of the alkalies.

The same distinguished spectroscopist has also published a simple method for the detection of cobalt in the presence of nickel and iron. The three metals are converted into sulphocyanides by means of potassic sulphocyanide. Carbonate of soda is now added to the intensely red solution until the iron is all thrown down. The solution is then filtered and shaken with ether and amylic alcohol, in which the sulphocyanide of cobalt dissolves with a blue color. When nickel as well as cobalt are present the ethereal solution is greenish, but the cobalt is detected by characteristic absorption bands between C and D. In a mixture of 400 parts of ferric chloride to 1 part of cobaltic chloride, the latter was distinctly visible, as also in the presence of 200 parts of nickel. This test for cobalt is so delicate as to indicate the presence of 0·0000258 gr. of metallic cobalt to the cubic centimeter of solution. Sulphocyanide of nickel solutions give no absorption bands, and the sulphocyanide of cobalt in aqueous solution only shows a broad dark place in the green.

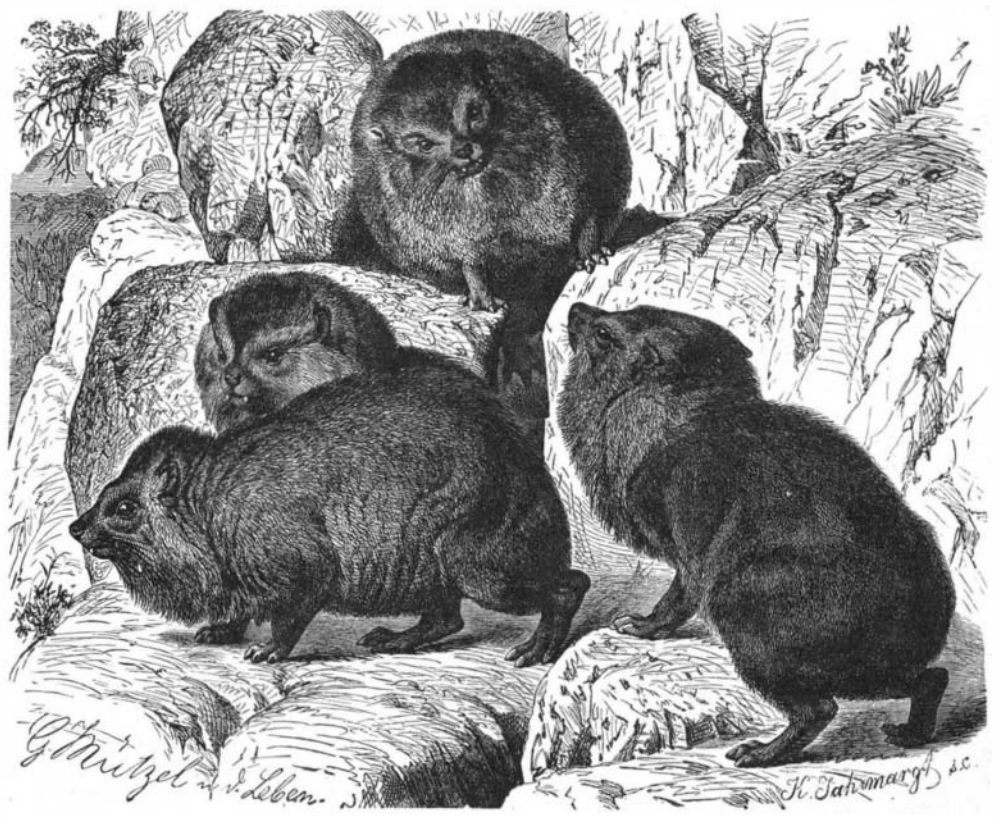
THE HYRAX.

One of the most curious little animals in existence is the hyrax, interesting not so much from its imposing external appearance, as for its importance in filling up a link in the chain of creation.

About as large as a tolerably sized rabbit, covered with thick, soft fur, inhabiting holes in the banks, possessing incisor-like teeth, and, in fine, being a very rabbit in habits, manners, and appearance, it was long classed among the rodents, and placed among the rabbits and hares. It has, however, been discovered in later years that this little rabbit-like animal is no rodent at all, but is one of the pachydermata, and that it forms a natural transition from the rhinoceros to the hippopotamus. On a close examination of the teeth, they are seen to be wonderfully like those of the hippopotamus, their edges being beveled off in a similar manner, and therefore bearing some resemblance to the chisel-edged incisors of the rodents. There are several species of hyrax, one of which inhabits Northern Africa and Syria, while the other two are found in Abyssinia and South Africa.

The South African hyrax is termed by the colonists klip das, or rock rabbit, and is found in considerable plenty among the mountainous districts of its native land, being especially common on the sides of the Table Mountain. It is largely eaten by the natives, who succeed in killing it in spite of its extreme wariness and activity. Among the crevices and fissures in the rock the hyrax takes up its abode, and may often be seen sitting in the warm rays of the sun, or feeding with apparent carelessness on the aromatic herbage of the mountain side. It is, however, perfectly secure, in spite of its apparent negligence, for a sentinel is always on guard, ready to warn his companions by a peculiar shrill cry of the approach of danger. Sometimes the hyrax is seen at a considerable height, but is often observed near the sea shore, seated on rocks which are barely above high-water mark.

Besides mankind, the hyrax has many foes, such as the birds of prey and carnivorous quadrupeds, and is destroyed in considerable numbers. The fore feet of this animal are apparently furnished with claws like those of the rabbit, but on a closer inspection, the supposed claws are seen to be veritable hoofs, black in color, and very similar to those of the rhinoceros in form. The hyrax is an agile little creature, and can climb a ragged tree trunk with great ease. It is rather hot in its temper, and if irritated becomes highly excited, and moves its teeth and feet with remarkable activity and force.



HYRAX.—(*Hyrax abyssinicus.*)

THE PICKEREL FROG.

BY C. FEW SEISS.

The pickerel frog (*Rana palustris*, Le Conte) is the prettiest and most strongly marked of the *ranidæ* found in this section of the country. Its ground color above is pale yellowish brown, with four rows of more or less regular, squarish dark brown spots from the head to the vent. There are commonly three or four spots in each dorsal row, from behind the eye to the bend of the back (supra-iliac prominence), but in a specimen taken near Camden, N. J., these

THE PICKEREL FROG.—(*Rana Palustris.*)

spots are confluent, thus forming two blackish bands (see left-hand figure). This is the only specimen I ever saw thus marked, although I have frequently observed two spots to be confluent. The spots are always margined with dull grayish white. There are two glandular dorsal folds, one on each side of a yellowish or bronze color, but they are not so well defined as in the crying frog (*Rana clamitans*) or shad frog (*R. halecina*). The body beneath is yellowish-white; posterior part of thighs granulated and of a bright yellow color in life. The legs and feet are barred and spotted with dark brown. Dr. Gunther, in his "Catalogue of the Batrachia Salientia," gives as specific characters: "Body with *two* glandular folds on each side. Above *greenish*, with a row of squarish darker spots between the glandular folds." I have found generally but one fold, and where two do exist the upper cannot properly be designated as such. It also commonly runs through the row of spots, and not above it. I have never seen a "greenish" pickerel frog, either alive or in alcohol.

The pickerel frog is for the most part solitary in its habits, except during the breeding season. Although it is called *palustris* (marshy), it is found in springs and brooks more frequently than in low and extensive marshes. With the exception of the wood frog (*Rana temporaria sylvatica*), this is the most slender and active species we have. It will spring upward several feet to seize an insect on the wing.

I have noticed a peculiar way it has of showing its displeasure. Thus when I dropped an insect in the vivarium near two of these frogs, and the most active or lucky seized and swallowed it, the disappointed frog wheeled around and struck the object of his displeasure in the face and eyes with his tongue. And it is evident from the way the assaulted frog closed his eyes and moved away, that he did not relish such treatment.

We had a male of this species in our vivarium two winters ago, who would persist in creeping down and completely hiding himself under the moss at the approach of every cold spell during the winter.

The length of an adult pickerel frog, from nose to vent, is about 3 inches. It is found in the eastern United States from Maine to Virginia.

Distribution of Plants.

BY REV. L. J. TEMPLIN, HUTCHINSON, KANSAS.

The world is full of wonders to every one who has not made up his mind to be astonished at nothing he may see. To the thoughtful mind there is much in nature to inspire wonder and admiration. The wise adaptation of means to ends, and the beautiful harmony that exists throughout all the realm of organic nature, lead the mind, free from bias, to the inference that some wise, intelligent power orders and governs all these relations and harmonies. Perhaps nowhere in nature is there a more manifest exhibition of wisdom in the adaptation of means to the accomplishment of a worthy purpose, than is seen in the various methods employed in nature for the dissemination of plants by the distribution of seeds.

In looking at this subject with an intelligent eye, the mind cannot shut out the conviction that some intelligent designer must have been employed in planning this scheme that has so much of both excellence and variety to recommend it to the judgment. To say that all this is to be attributed to chance, is to endow chance with all the attributes of a Deity, which is the very reverse of the idea intended to be conveyed by the term. In the sense intended it is perfectly absurd to attribute this or any other work to chance, for in that sense chance is nothing, and consequently can do nothing. So we regard it as the result of evolution; but I cannot see that this relieves the difficulty, even if the truth of the theory of evolution be admitted. Evolution is simply the working out of certain results under the operation of law. But what is this law? It is not correct to say that it is force, though I think many make this mistake. Law is only the established order or manner in which force operates; so that if we admit the intervention of law and a thousand or ten thousand secondary causes, still this law must have originated with a lawgiver, and behind all these secondary causes the mind must rest at last on the first cause, the author of all other causes. But I did not start out to write a moral or philosophical essay, but to call attention to some of nature's method of distributing the vegetable kingdom over the world. In producing these results we find three classes of agents at work: the waters, the winds, and animals, besides certain arrangements within the plants themselves for the accomplishment of this purpose. And we find the seeds themselves adapted to these different means of transportation. The light character of many seeds well adapts them to floating from place to place, while their impervious coverings protect them while being carried long distances by the currents of the ocean or of rivers, and then when they lodge on some island or other shore they readily spring up and grow. What, for instance, can be better adapted to floating from island to island than the tough, corky covering of the cocoanut? The seeds of grasses and other plants are washed down from the higher grounds by streams, and they are thus widely distributed.

The seeds of many plants, as of the dandelion, thistle, and a long list of similar plants, are furnished with a tuft of downy or silky pappus, that will enable them, when ripe, to float away on the breeze and thus be scattered far and wide. The seeds of some species of poplar, as cottonwood, are attached to a bunch of fine cotton that serves as a buoy to bear them up through the air, by means of which they are frequently carried many miles from the parent tree. Seeds are often disseminated through animal agency. Animals frequently carry seeds and nuts away and bury them for winter food, where they are forgotten and left to grow.

Many seeds of fruits are swallowed by birds and carried to distant places and voided uninjured, and there spring up and grow. Thus the seeds of cherries, grapes, gooseberries, blackberries, and many others of like nature, are sown broadcast over a large extent of country. During an invasion of the Rocky Mountain locusts into Iowa a few years ago, they left the ground where they fed thickly strewn with the seeds of some species of grass, new to that locality,