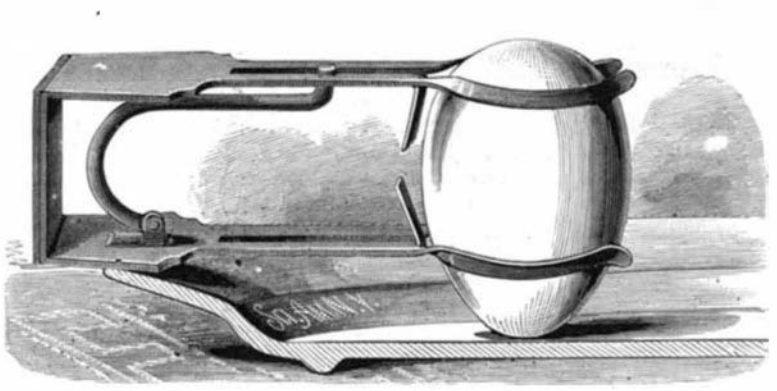
An improved pole for telegraph wires, flag staffs, lamp posts, clothes line supports, etc., has been patented by Mr. David Lathrop, of Hazle Dell, Ill. It consists in the pole formed of three sections sliding or telescoping into each other.

Mr. Andrew Elvin, of Paterson, N. J., has patented a steam boiler which is so constructed that they may be easily, conveniently, and cheaply built, and easily, conveniently, and cheaply repaired. It consists in a steam boiler with a flue extending through it and filled with vertical tubes, and provided with braces or partitions, the whole detachably secured into an outside shell.

NEW EGG HOLDER.

The egg holder represented in the accompanying engraving is the invention of Mr. John S. Birch, of Orange, N. J. It consists of a spring tongs having branched and bow-shaped prongs adapted to clutch the sides or ends of the egg. It is designed more particularly for use at the table, and is better adapted than the ordinary cup to hold the egg on the plate. The prongs are provided with guards to compel the egg to assume the right position, and there is an egg shell discharging device consisting of a curved wire hinged to the lower jaw of the tongs and capable of sliding in a slot in the upper jaw. By pulling this wire the jaws are separated, allowing the shell to fall out.



NOVEL EGG HOLDER.

King Cotton.

The stern-wheel iron steamer Charles P. Choteau recently landed at New Orleans the largest cargo of cotton ever carried by one vessel on the Mississippi, and probably in the world. It consisted of 8,841 bales, the huge mass, piled tier above tier, almost hiding the steamer from view.

New Mode of Exciting an Induction Coil.

Mr. W Spottiswoode, LL.D., finds it a good plan to use the alternating currents of a De Meritens magneto-electric machine to excite an induction coil. In this arrangement the "make" and "break" currents in the primary are alternately in one direction and the other, hence the secondary discharge appears to be the same at both terminals. The advantages of the method are: First, the fact that as the machine effects its own make and break, both the contact breaker and the condenser of the induction coil can be dispensed with; secondly, that the breaking of the primary, and consequently the delivery of the secondary currents is perfectly regular; thirdly, that the quantity of the currepts in the secondary is very great. With a 20 inch coil by Apps a spark about 7 inches in length, of the full thickness of an ordinary cedar pencil, has been obtained. But for a spark of thickness comparable at least with this and of 2 inches length, an ordinary 4 inch coil is sufficient. In vacuum tubes under this discharge the striæ are perfectly steady, as with a battery (Gassiot's or De la Rue's), and their brilliancy and configuration can be controlled by means of a shunt in the secondary circuit, formed by a column of glycerine and water, so as to diminish at will the amount of current flowing into the tube.

A Mine of Palm Oil.

According to the *Colonies and India*, that portion of the west coast of Africa which lies south of the River Volta furnishes the principal supplies of palm oil. Nearly 1,000,000 cwt. of this oil are annually exported to Great Britain, of the value of $7,500,000, its principal use being in the manufacture of soaps, perfumery, candles, and similar articles. Among the natives it is highly valued, both for food (taking the place of butter), for lighting and cooking purposes, and for anointing the head and body. The so-called oil, which is rather a fatty substance, resembling butter in appearance, is obtained from the fruit of several species of palms, but especially from the one known botanically as *Elais guineensis*, which grows in abundance on the western coast of Africa, and from which it takes its specific name.

So thickly do these trees grow, and so regular and rapid are their supplies of fruit, that in some localities where the regular collection of the produce is not practiced, the ground becomes covered with a thick deposit of the oily, fatty matter produced by the ripe berries. Deposits of palm oil, which may almost be called "mines" of vegetable fat, exist in some parts of the Gold Coast, and which, if not in themselves worth working, at least practically illustrate the natural wealth of the country in such productions, and indicate its undeveloped resources. These "mines" would probably not repay the cost of exploration, as the palm oil is apt to become rancid and valueless for its general uses after long exposure, though for such purposes as candle making these deposits might still be valuable.

THE GILA MONSTER.

This reptile, which Professor Cope calls *Heloderma suspectum*, and to which the specific name *horridum* has also been given, is not uncommon in Utah, New Mexico, and Arizona. It is believed to be very poisonous, but such is not the case. It will bite fiercely when irritated, but the wound is neither painful nor dangerous. The Mexicans assert that its breath is fatal, probably because of its habit of blowing when disturbed.

In the "Zoology of the Survey of the 100th Meridian" it is stated that several specimens were secured in 1881, 1873, and 1874; but with one exception all were lost in transit to Washington. The specimen from which the accompanying drawing was made was kindly forwarded to us by Mr. T. W. Parker, of Phœnix, Arizona Territory, who writes that it inhabits all the mountainous regions along the Pacific coast as far east as the dividing ridge. Very little is known of its habits, except by the natives, who regard it as the most terrible of reptiles, not excepting the rattlesnake.

The Gila monster grows to the length of three and a half feet. Its food is such small reptiles, mice, crickets and other insects that it can easily capture. It is sluggish in movement, traveling no faster than the tortoise. When disturbed it stands as erect as possible and blows at its antagonist, sending forth a stream resembling fog, and believed by the natives and Mexicans to cause instant death. The first Gila monster Mr. Parker ever saw was on Salt River, ten miles from Phœnix. It was about 14 inches long, and was in combat with a snake 4 feet in length. The snake coiled in the usual manner, and as the monster advanced struck his blow firmly, producing no effect upon the tough scaled skin of his foe. The monster then rushed upon the snake, and seizing it with its arms and legs gave two or three bites, then let the snake go. The latter crawled away slowly, seeming to be badly hurt. The monster also took refuge in the brush. Evidently the monster's breath does not paralyze snakes. However, from what he has seen Mr. Parker is inclined to believe that there is truth in the stories the natives tell.

A saloon-keeper of his aquaintance captured a monster alive, and kept it for the amusement of his customers. It was tied in a corner, and as the floor was of earth, as in all houses in those parts, the reptile burrowed a considerable hole as a hiding place. One day—Mr. Parker does not say that he witnessed the affair—a mouse ventured near the hole; the monster sent forth a stream of poisoned breath, and the mouse fell paralyzed. The monster then seized and devoured it. One cannot but wonder that with so favorable an opportunity no one had the wit to test the truth of the popular belief as to the poisonous character of the monster's breath by submitting to it a variety of small animals.

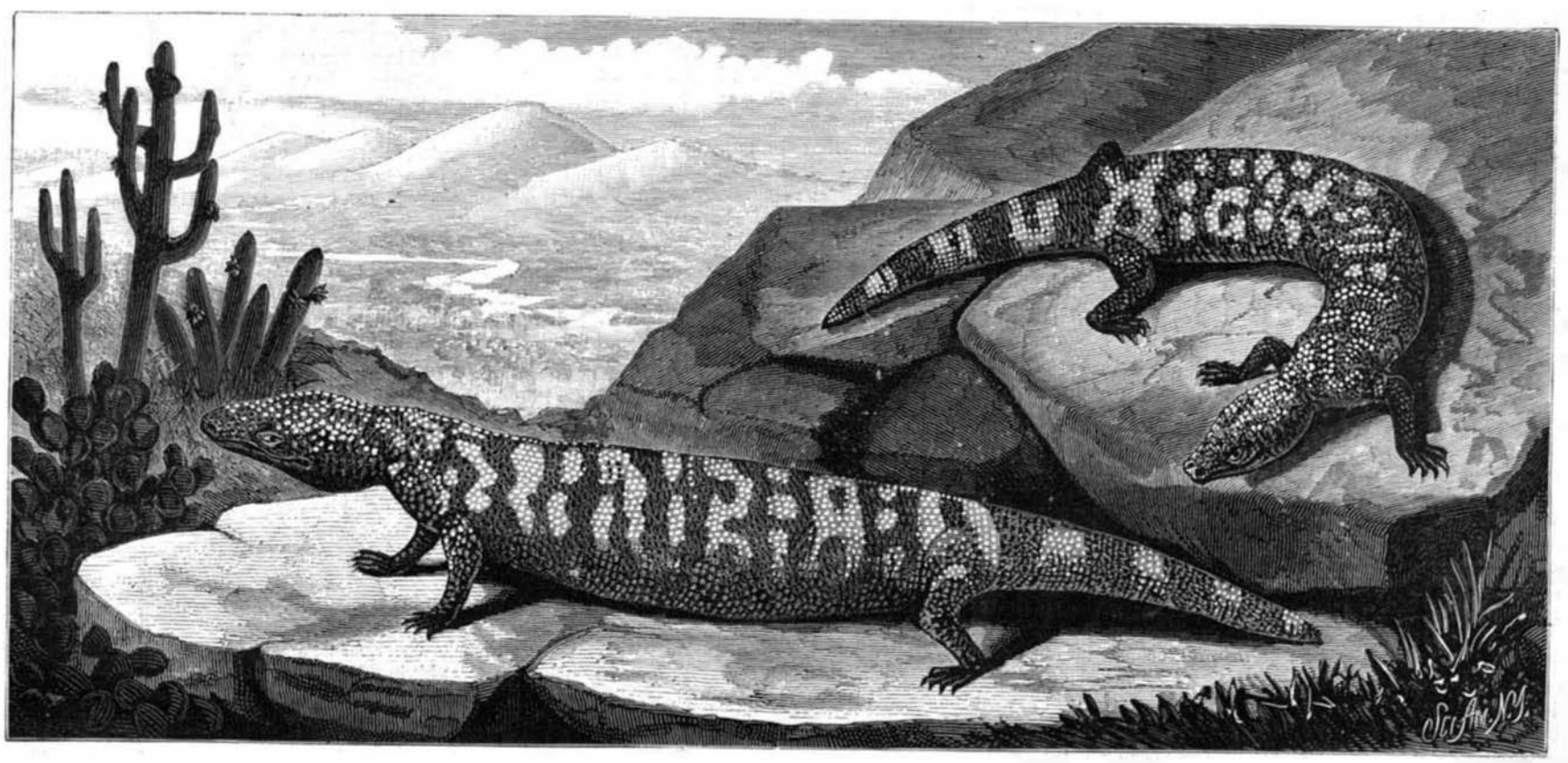
Mr. Parker does not think the monster able to defend itself with its teeth, the latter being so small. Yet he says that he is credibly informed that a man in Arizona, who was bitten while tantalizing a monster, has been paralyzed on that side ever since. It is certain that the Mexicans and natives of those parts regard the reptile with the liveliest apprehension.

Names of Wood Manufactures Wanted.

Mr. Charles S. Sargent, special agent of the tenth census, to whom has been committed the collection of statistics of forest wealth and products for the coming census, wishes information with regard to uses of unsawn lumber. All lumber which passes through sawmills can be readily reached by the ordinary enumerators. What Mr. Sargent wishes to get track of is the considerable applications of wood in manufacture, where small timber or unsawn wood is employed. Any one who can furnish him lists of such uses may materially aid in increasing the scope and value of this portion of the census statistics. Mr. Sargent's post office address is Brookline, Mass.

Cotton by White Labor.

It used to be said that white men could never take the place of the blacks in our Southern cotton fields. Experience has shown the assertion to have no foundation in fact. Inquiries made during the past season by several Southern members of Congress develop the fact that a large portion of the last crop was raised by white men by their own labor. Mr. Manning, of Mississippi, says that the facts he has collected justify the opinion that three-fifths of the crop of 1879 was produced by free white labor.



GILA MONSTER.—(*Heloderma Suspectum.*)

Preparation of Castor Oil.

BY ERNEST P. RAAB, PH.G.

Castor oil is obtained in the United States by the following method, as witnessed at the "Belleville Oil Works," owned by Messrs. Brosius & Son. The seeds having been thoroughly cleansed from the dust and particles of the pod, with which they are more or less contaminated, are placed in an iron reservoir and slightly heated. Great care is taken to prevent them from being scorched, the object being only to make the oil more fluid for expression. The pressing is now proceeded with by means of hydraulic presses, which are preferred on account of the great force exerted by them. Each piece has a series of movable plates and cylinders, of which each cylinder is filled, the plate pushed in, and then the power applied. The first quality oil is thus expressed, and runs into a large tank below. The pressed seeds are now heaped into a pile and allowed to remain for a day. Next day they are again heated in another iron reservoir, put into a series of cylinders, power is applied, and the second quality, or lubricating oil, is obtained. Messrs. Brosius & Son use a portion of their oil cake for fuel, and send the remainder to the East, where it is utilized in combination with other matter to produce artificial guano. A Philadelphia firm, Messrs. Baeder, Adamson & Co., have resorted to bisulphide of carbon as a solvent for the press cake, thereby obtaining a dark thick liquid. The process is similar to that carried on in France with alcohol, the product, however, being a very common lubricating oil, but without smell of bisulphide of carbon. The firm does not now manufacture any more.

The oil made by the process in use at the Belleville Oil Works is called cold pressed, to distinguish it from any of the other methods in which more heat is employed. The cold pressed oil without doubt deserves the preference, and is now extensively used. The yield per bushel after two expressions is sixteen pounds, or two gallons; the first expression yielding twelve pounds, the second four pounds. Sometimes a third expression is resorted to, but this oil is much colored, and the yield so very small that it hardly pays for the labor and expense incurred; the yield is from one to three pounds.

The process of purifying and clarifying the oil is accomplished in various ways, and is the specialty of every factory. The great point in purification as well as clarification to be noticed is the fact not to expose the oil too long to the air, as it is then liable to become rancid. The first expressed oil is clear white, or rather colorless, like water; the color of the second expression is yellowish, like sirup of squills. Castor oil is remarkable for its power of mixing, in all proportions, with glacial acetic acid and with absolute alcohol without the aid of any other agent. It is soluble in four parts of alcohol, 0·835 or 0·850, at 15° C., and mixes without turbidity with an equal weight of the same solvent at 25° C. Its specific gravity is 0·97 to 0 98; it congeals —at 12° to —13° C., and becomes solid at—40° C.

The oil of the first expression is used for medicinal purposes; that of the second for oiling leather, lubricating machinery, burning, and various other purposes.

The oil cake is either, by the addition of animal matter and other ingredients, made into manure, artificial guano, or is used for fuel. The latter is the customary practice in large oil mills, where a saving of from 40 to 50 dollars a week is effected thereby.—*American Journal of Pharmacy.*

Gum Copal.—A New Theory Concerning the Supposed Sand Marks.

At a recent meeting of the Society of Natural History at Portland, Me., the President, Dr. William Wood, made a verbal communication of much interest in relation to the resin commonly known as gum copal. We copy from the report of the Portland *Advertiser:*

Dr. Wood stated that M. C. Cooke, of London, had made the only approach to a scientific arrangement of the gums and resins that he had been able to find. He has made four principal groups—gums, gum resins, resins, and oleo-resins. The gums, like the arabic and cherry kind, are more or less completely soluble in water. The gum resins are partially so, but the true resins are insoluble in water to any degree, and the hard resins, like some of the copals, are absolutely insoluble in oils or alcohol without some previous method of preparation, while others are capable of being suspended in volatile oils, and are classed as oleo-resins.

Resins are derived from the vegetable kingdom, and nearly all plants produce them in a greater or less degree. But the trees which produce them in sufficient quantities to be of commercial value are to be found principally in South America, the East Indies, and Africa. These belong principally to the natural families of *Dipteraceæ,* or wing fruited trees, only found in India and the islands of the Indian archipelago, and the *Leguminosæ,* or trees which bear pods, like the locust and acacia trees. Of these the Hymenæa seems to be the tree from which the resins most nearly akin to the true hard or fossil copal are mostly derived, though the Vateria and some others have been regarded by many as the sources of the copal resin known in England as anime. But in a note to the *Gardener's Chronicle* (1865) the conclusion seems to be reached after careful comparison with specimens in the Kew Herbarium, that they are derived from *Hymenæa mossambicensis.* From these trees and many others a great variety of copaline gum resins are derived, and are known in the markets as raw copal, copal *vert* in the French market, "tree copal" or *chakazi,* corrupted by the Zanzibar merchants to "jackass" copal.

But the true or ripe copal, properly called *sandarusi,* is the produce of vast extinct forests, and furnishes at the present day the only yet very conclusive evidence of their former existence. It is found buried at depths varying from a few inches to two or more feet, over immense tracts of sandy deserts in Africa, where now no traces of vegetable life exist, except such as, in small masses, are occasionally found under the sands, still clinging to the gum, but so frail as to crumble away at the touch. The resins derived from this source are found to be fretted all over, and that, too, very equally in every angle, indentation, and curve of the surface, with little elevations and depressions of nearly uniform size and character, to which the technical name of "goose skin" has been given. This peculiarity distinguishes the true ripe copal, or "fossil" copal, from all other kinds; and as it is the most valuable, the natives resort to many devices for making the *chakazi* sell for the true copal. The general opinion in regard to the origin of these indentations upon the surface is, that they were made by the impress of sand, when the gum in a soft state was buried in it. This opinion seems to have been a sufficiently satisfactory one, so far as is known, down to the present time, to all who have written upon this subject. So plausible and apparently so natural was this explanation, that no one seems to have doubted its correctness, and, like many another error, it has been passed down from one to another unquestioned.

It was with the design of calling the attention of the society to the question of the origin of the markings upon its surface, that the subject of copal has been introduced for discussion this evening. An examination of some very fine specimens that have been recently presented to the society by Mr. Augustus P. Fuller of this city, was the means of first raising a doubt in the minds of some of us as to the correctness of the established sand theory. It did not seem to bear the test of criticism. Here were masses of very different forms and sizes, some round, others angular, even triangular, with curved faces and jutting points with thin edges; yet all were equally embossed and indented at every point of their surface, even to the thin edges and extremities of the angular ones, and upon every portion of the surface of the rounded ones. It would be difficult to explain how such finished masses could be formed by the ordinary exudation from a standing tree of a liquid mass into the sand. The theory is that the vast areas now occupied by sandy deserts were at some former period, in their whole extent, covered by mighty forests, when the trees must have stood in deep and more or less fertile soil. But even taking it for granted that these exudations were poured out upon the sand, the first layer that reached it would become covered by it, and the next layer would cover this and in its turn be covered by sand, so that the sand itself would have been confined in its interior, very much as the insects which are occasionally found entombed in its transparent walls. But no such occurrence is known. No particles of sand are found in the interior of these masses of resin; or if at all, they are probably even more rare than the insects. This method of pouring out the more or less fluid resin upon the sand cannot be made to fulfill the requirement of indentations made upon the surface only

But suppose that this resin is poured into cavities within the tree itself, made in the progress of natural decay or by the inroads of wood ants or other insects. We shall have all the conditions by which to explain the peculiarities in forms of these masses of resin, the indentations upon every particular part of their surface, and the entire absence of sand from their internal structure. These resins in their nature are imperishable by the lapse of ages and by the causes that have removed from the surface of the earth all traces of the soil and trees that produced them. Buried in the sands that, in the gradual process of change from forest to desert, have swept over these vast areas, they furnish to-day the only evidence of the former existence of such forests. We have some proof of the imperishable character of these resins where they have been employed in the mummifying processes of the ancient Egyptians. Yet these are probably as modern as they are imperfect in comparison with the mummied insects that nature has preserved in all their perfection and beauty in these wonderfully transparent and highly burnished walls of the copal. In regard to the age of copal no entirely satisfactory answer can be given. Professor Gunning has well said "that the revolutions of nature from forest to desert are never achieved in a day, and that the fly or moth which looks as if it had just lit in its crystal coffin, may have been there a hundred thousand years. We are sure that it was there, just as you see it to-day, long before there was any man on earth." The insects found in the copal are said to be those of living species, while those found in amber are of extinct species, and it is claimed that this becomes one of the tests by which gum copal is prevented from being passed off as amber. If this be so it becomes a difficult task indeed to measure the immense antiquity of the amber in such common use at the present day.

The microscope has furnished an important aid in support of the theory of the formation of these copaline masses in cavities of the trees. Coniferous trees, such as the pines, firs, etc., have a peculiarity of structure by which microscopists can determine their presence with certainty whenever and wherever this structure is found, whether in peat, lignite coals, or silicified wood. The woody tissue of these trees is wholly made up of little tubes or cells pointed at at both ends, having upon the surface of each tube one or more rows of circular gland-like disks, each disk having apparently a smaller opening in the center, looking like a ring within a ring. As the pointed extremity of one tube overlaps that of another, the tubes have the appearance of being continuous and of being placed between parallel lines. The impression of just such a structure is easy to be observed upon the surface of the copal, and it is difficult to understand how these impressions could have been made in any other way than by the resin in a liquid state being poured into cavities within the trees. The walls of these cavities in some instances were probably in a state of partial decay and allowed the resin to well penetrate its tissues. There it would harden, and in process of time, when the trees crumbled to dust, would become loosened and ultimately buried in the sands that took the place of or covered up the former soil. These impressions indicate that these trees were almost certainly of the cone-bearing family, and this may in part explain the difference in solubility of the fossil copal and all the species of the *chakazi.*

I have examined several pieces of amber kindly loaned to me by Mr. Kirsch, of this city, in their natural condition, or rather, as they were received by him for the purpose of manufacture. But if this "goose skin" was ever to be found upon them, it has been roughly removed in their preparation for the market, which is, probably, in no way made better by its preservation, as it is in the case of the copals. The surface, however, still appears to bear the impression of cellular tissue.

Chest Development and Consumption.

It is stated "that during the last twenty-five years not a single singer has died of consumption at St. Petersburg, although this disease has outstripped all others and now holds the first place among the causes of death in the Russian capital." From this and other facts Dr. Vasilieff draws an inference in favor of the exercise involved in singing, as a preventive measure against consumption. There would seem to be room for question as to the relation of cause and effect. It may either happen that singers are not consumptive because they can use their chest and throat freely, or that consumptive persons are not singers because the weakness which precedes disease incapacitates the chest and throat for exertion. Both of these hypotheses are true up to a certain point, but neither holds good in all cases. A very little observation will suffice to show that a good singing voice may coexist with a weak or diseased chest, whereas the perfectly healthy may be unable to sing.

It was some forty years ago a common practice to give consumptive patients a specially arranged tube to breathe through with the view of exercising the chest. We venture to hope the experiment will not be repeated. Chest development can only be accomplished in a manner consistent with health during the growing stage of childhood, and then the most natural and convenient methods of exercise are the best. Later on in life great mischief may be done by unduly straining the muscles of the thorax and those of the throat, besides the peril of injuring the smaller tubes and air vessels of the lung by violent exertion, for which the organs of respiration and voice are not adapted because they have not been early trained.—*Lancet.*

Counterfeit Eggs.

It is well known that in America everything is counterfeited; the wooden hams and nutmegs sent from the New England States are well remembered. Eggs are now also counterfeited, and this manufactory is carried out on a large scale. On one side of a large room the reporter saw several large copper vessels filled with a thick glutinous yellow mass, which a man was constantly stirring. This was the yellow of the egg—the yolk. On the opposite side were similar vessels, in which the white was fabricated. The egg shells were made of a white substance resembling plaster of Paris, by means of a blowpipe, just as soap bubbles are blown. After being dried in an oven, the egg shells were filled: first with artificial albumen, then with some of the artificial yolk, and lastly with a little of the artificial albumen. The small opening at the end of the egg was closed with white cement; and the greatest achievement of modern civilization, the artificial egg, was ready. In appearance it resembled a natural egg; but, whether cooked or raw, it was indigestible and injurious to health.

[The above we find in the *Canada Medical and Surgical Journal,* credited to the *British Medical Journal.* To make his story complete the writer should have added that at this same manufactory he also saw a number of patent incubators employed in hatching out chickens from these artificial eggs, which was causing great excitement among the farmers and poultry raisers.—EDS.]

Leather from Bison Hides.

The *Western Shoe and Leather Review* remarks that leather from bison hides will soon cease to be a factor in the leather market. These hides began to be sent East in considerable quantities about ten years ago, but did not at first find favor with the tanners here. In the latter part of 1873 two or three large tanning firms took hold of them, and by careful attention in saving and properly preparing the hair and glue stock for market, as well as in the proper tanning of the hide to make a serviceable article of cheap sole leather, they made a great hit in this specialty.

It is estimated that for the past five years about 350,000 bison hides have been taken off annually; now, however, the supply is virtually exhausted, and East India and common hides must be depended upon for future supplies of cheap sole leather.

Calico Printing.

[Abstract of a paper recently read before the Roundabout Club, a literary society, of Melrose, Mass., by L. Williams.]

The lecturer remarked, in commencing, that if Cotton is King, Calico must be *Prints*. Like charity it covers a multitude of sins, and many a man has experienced the dangers that lurk in calico, so that only a veteran should approach it No material for garments was ever so universally worn except one, and that years ago, in a far off land, where the whole female population wore fig leaves. Calico is derived from Calicut, a town in India where the cotton cloth was first made, and strictly speaking is plain cotton cloth, after being figured it becomes prints. The most common cloth now used for printing is known as 64 square 7 yards, meaning a square inch of the cloth counts 64 threads each in the warp and filling, and 7 yards weigh a pound. Immense quantities of this cloth are used annually by the calico printers In the city of Fall River alone there are thirty printeries, and their weekly product is 149,000 pieces, and their monthly pay roll amounts to $310,000; and besides these mills there are hundreds of thousands of yards made in Lowell, Manchester, and other large cities. There are cheaper prints, but the demand at present is for higher grades than the average, which shall weigh 6 yards to the pound and count from 72 to 100 square. Printed calico was probably known to the Egyptians several thousand years ago In India, the printing of calico was originally the well known Randanna pattern, and printed on silk as well as cotton. The manner of making the little squares and other figures seen upon these goods was very primitive, and consisted of tying bits of cord around small portions of the cloth before it was put into the dye pot. Then the yellow or red dye would color the cloth except where it was tied by these cords, these latter spaces being left irregular and white. This was followed by a certain paste or wax laid upon the cloth, which would resist the dyestuff, thus saving the spot beneath so that the wax being removed the white figure would remain. The next idea was to prepare plates of lead, through which were cut the required figures. One of these was laid at the bottom of a large number of these layers of dyed calico, and the other on top, the figures being exactly opposite each other. A powerful pressure was then applied, and an acid, strong enough to take out the color without injuring the fabric, was poured in at the top upon these figures, slowly penetrating the mass and being kept in by the pressure, and thus forming the figure. The next advance was to block printing, the pattern being engraved on blocks of wood, smeared with the color, and stamped on the calico. A greater variety of figures and colors were produced by these, but only by using separate blocks for each color, and also one for the ground and another for the dark line always observable between every figure.

By the "Toby Tub," next invented, all the colors were stamped with only one block, and on the edges of these were pins, which pricked the cloth exactly where to place the next block in stamping, which was done by boys seated at long rows of tables, each with block and color. The calico was stretched between the feet of the boy from one end of the room to the other, and as it was pulled slowly along, each boy would stamp his pattern.

The printing of calico was introduced into England in the seventeenth century, but little progress was made until 1764, when Robert Peel, grandfather of the future prime minister, left the plow for the printery. The block he used, however, had a handle on the back, struck by a mallet to produce an impression. A piece of calico of 28 yards required 448 applications of the block. Copper plates, working much like an old-fashioned press, came next, and in 1785 the cylinder press was invented, and one of the old style was shown by the speaker and described, who said the calico printing press of to-day is the same thing, and the 28 yards of cloth can now be printed in two minutes. The expense of engraving the copper rollers of the cylinder was very great, and they soon wore out. About this time Jacob Perkins, of Newburyport, born there 1766, and who also invented *steel* plates for bank notes, brought out a process of transferring the engraving from a small three inch long steel cylinder to the large copper roller, by first cutting on the soft steel, hardening it, and then bringing it out in relief on a second cylinder, from which, after again hardening, it is pressed on the copper roller, which, when worn out, can easily be renewed.

The partograph is another method of engraving, and the operator sits at a table with the print design before her (for a partographist is generally a very skillful young lady), marked out on a zinc plate nine times the size required. Above the table and in front is the copper roll to be engraved, covered with wax. The operator applies the point of the partograph to the zinc, and immediately a set of pointers attached to the one she is using, by machinery, scratches the same figure through the wax on to the copper roller above. This roller is then immersed in a bath of nitric acid, which eats into the copper where the lines are traced, and thus engraved. The design is made nine times its size by being placed in a camera, and afterward rubbed into the zinc, making it more distinct to the designer.

Let us follow a piece of calico from its unbleached state to a finished condition. First, it is bleached to make it white, then it is singed by placing over gas jets or red hot plates to remove the nap or fuzz, and it is then ready for the printing machine, which weighs 10 tons, is 10 feet high, and will print from 1 to 12 colors at once. The figure is engraved on copper rollers, each having a separate roller, which revolves in a trough of coloring matter, covering the roller completely, but a parallel flat rod called the 'doctor," the exact length of the roller, scrapes from it all the color except in the engraved lines, and as the cloth is pressed against the roller, the figure is stamped, each roller imparting one color only, and each exactly fitting the other. Colors and their formation of various chemicals were very fully described by the lecturer, who stated that within eighteen months a great revolution has taken place in the printing of calicoes, and that certain colors, like green, blue, and yellow, once hard to produce, can now be brought out at will, and madder, once so important, is now a thing of the past, and superseded by steam colors and chrome, which last fixes the color Finishing, folding, labeling, and packing into cases complete the task of printing.

Each case contains 2,000 yards, or enough to clothe 200 women. There are 350 printing machines in the country, with a capacity of printing 1,500 pieces each, or a total of 525,000 per week, each piece containing 40 yards, or 21,000,000 yards, and the United States stands second in the business, the printeries of England placing her number one, one printery alone near Manchester running 52 machines; and in France, also, are many manufactories. Mr. Williams said that twenty years ago not a jobbing house in Boston but had a line of English goods, but to-day, and for some time past, it would be difficult to find any; our best designers, however, are from the mother country, and those printers are most successful which employ best designers and printers.

In the Centennial year numerous curious and patriotic designs were made, and a very rare bed quilt made from these was exhibited, the lecturer declining to mention the number of pieces in it, remembering the old proverb, "As you make your bed quilt so will you *lie*." He first suggested a design for patchwork calico, thus saving the time of old ladies, who formerly spent it in making patchwork quilts; and one of these patchwork designs has been produced more than any other engraved in this country. There was a fierce struggle against the introduction of calico by manufacturers of linens and woolens in England and France, and laws were enacted forbidding its manufacture and also its sale, until Madame Pompadour first procured its use in France for furniture covering. It first made its appearance in America in 1788, in the State of Rhode Island, but strenuous opposition was made by the English to have either machinery or printers brought over the water. The lecture closed with some humorous stories concerning calico, and good advice was given to young men about choosing a wife who always displayed neatness and good taste in her morning calico.

A collection of designs of various styles and of the machinery and apparatus used in producing these prints, was used in connection with the lecture, and aided in making it one of the most interesting and instructive ever given in the town, and one much appreciated by the audience.—*Boston Journal.*

Timbuctoo.

The following information with regard to the little-known city of Timbuctoo was lately obtained by the Geographical Society of Oran, Algeria, from an Israelite Rabbi of Morocco, who was on his way from Timbuctoo to Paris. The Rabbi described Timbuctoo as an Arab town in every sense of the term, built absolutely like all those of the interior. The inhabitants are Foulah negroes, and there are no whites. There are, however, sometimes Jews from North Africa, who come to trade, but they never settle there. The town is at about an hour's distance to the north of the Niger. Its population is about 50,000; it is larger than Oran (about six miles round), but not so large as Marseilles. The town is, in fact, a mass of villages, extending over a very considerable area. The Niger, which passes to the south of the town, flows from the west to the southeast, and is very broad; there is abundance of fish. Navigation is carried on by means of oared barges and rafts, constructed of pieces of wood bound together by cords. The blacks call the Niger the Nile, or "El Bar" (Arab, "the sea"). The river is subject to regular floodings, which fertilize the lands on its banks, the only ones which are cultivable; the inundation reaches the walls of the town. The country is very fertile; the crops are sorgho, millet, rice, tomato, onions, turnips; indigo grows wild. There are also many cocoanut trees, gum trees, and a tree which produces oil which the natives use for lighting. There are also forests of valuable timber trees. The country is governed by a Marabout, who takes the title of Sultan; the present ruler is named Mohamet-el-Bekai. He does not reside at Timbuctoo; his capital is Ahmet-Ellah, a town of more than 100,000 souls, situated about twelve leagues from Timbuctoo. The road connecting the two towns is covered with villages and gardens. The town of Timbuctoo is under the command of a Caid, who has very great authority, and who has under his orders a tax collector, also very powerful. The Sultan has no army, but when fighting is necessary everybody is a soldier They are armed with bows and arrows; only the chiefs have guns, pistols, and sabres. Trade is carried on principally by barter or by means of cowries. Caravans bring cotton or linen goods, glass trinkets, mirrors, arms, swords, guns, pistols (generally of English manufacture), knives, needles, etc. Salt is a valuable import, a slave often being given for a kilogramme or two. The caravans take back loads of the grain of the country—rice, sorgho, millet, ostrich feathers, gum, ivory, gold dust, lead, copper, etc. Trade in slaves is carried on on a very large scale. To the north of Timbuctoo too many camels are reared; to the south the people wander about with herds of sheep and cattle.

ENGINEERING INVENTIONS.

An improved engine governor and speed regulator has been patented by Mr. Joseph Reid. of Monroe, La. This invention relates to a governor based upon the principles of gyroscopic action. A reliable automatic stop device is provided, which, being a portion of the governor that is regularly in use, is not liable to become gummed or stopped, but is always in working order.

An improvement in rock boring machines, patented by Mr. William W. Graham, of West Rutland, Vt., relates to adjustable brackets, gauges, and guides for what are known as "diamond rock boring machines," the object being to provide means for boring the alternate holes of a series the proper distance apart, at whatever angle they may enter the rock surface; also to provide means for preventing the boring hub and spindle from running to the right or left of the line, thereby insuring an open communication between the holes bored by the first and second operations.

An improvement in bridges has been patented by Mr. Robert B. Vardell, of Dardanelle, Ark. The object of this invention is to provide a bridge of great strength and durability, that can be thrown across a stream at a single span, and require for its support only an abutment at each end.

Mr. Michael F. Craig, of Nevada City, Cal., has patented a device which consists in the combination, with a locomotive, of apparatus for sprinkling or wetting the rails either in front or behind the driving wheels, as circumstances may require, the apparatus being under control of the driver.

An improved rotary engine has been patented by Mr. George Murray, Jr., of Cambridgeport, Mass. The object of this invention is to provide a novel and simple device that can be used as a steam or hydraulic engine to transmit power, or as a force pump or blower when power is applied to it. It consists, essentially, of a universal joint with solid sections fitted snugly, but so as to revolve within a globular shell.

Mr. John C. Dean, of Indianapolis, Ind., has patented an improvement in valve gears, which consists of an arrangement in the steam chest of a direct-acting steam pump, of an auxiliary piston and valve, that are so operated as to regulate the admission and exhaust of steam to and from the main steam cylinder, and prevent loss of steam when the pump is in operation.

An improvement in spark arresters for locomotives, patented by Mr. David Hawksworth, of Plattsmouth, Neb., consists in a cup-shaped spark arrester that deflects the sparks against the sides of the stack. This is combined with a stack having an annular chamber that receives the sparks, from which chamber they are drawn by suction obtained by the use of an interior conical pipe or nozzle, the sparks and cinders being thus circulated and broken up until they pass off in dust.

Mr. Charles Bried, of Newark, N. J., has invented a boiler shell constructed of convexo-concave plates, united together with their convex surfaces inward to form a fluted cylinder, and with their joints stayed against springing by braces applied at the outside of the boiler, whereby the shell is rendered capable of sustaining high pressure at the inner side without spreading or rupturing.

Gloomy Thoughts and Gloomy Weather.

Dull, depressing, dingy days produce dispiriting reflections and gloomy thoughts, and small wonder when we remember that the mind is not only a motive, but a receptive organ, and that all the impressions it receives from without reach it through the media of senses which are directly dependent on the conditions of light and atmosphere for their action, and therefore immediately influenced by the surrounding conditions. It is a common-sense inference that if the impressions from without reach the mind through imperfectly-acting organs of sense, and those impressions are in themselves set in a minor æsthetic key of color, sound, and general qualities, the mind must be what is called "moody." It is not the habit of even sensible people to make sufficient allowance for this *rationale* of dullness and subjective weakness. Some persons are more dependent on external circumstances and conditions for their energy—or the stimulus that converts potential kinetic force—than others; but all feel the influence of the world without, and to this influence the sick and the weak are especially responsive. Hence the varying temperaments of minds changing with the weather, the outlook, and the wind.—*Lancet.*

The Scientific American in Turkey.

The United States Consul General at Constantinople writes to this office, under date of October 31, that he had sent a copy of the SCIENTIFIC AMERICAN to the Palace, and it is, adds the writer, a gratifying evidence of the interest it creates, that the Sultan has ordered portions of it to be translated into Turkish for his reading.