

air with a tremulous movement of the wings. Its movements are singularly elegant, and while engaged in feeding it performs the most graceful maneuvers as it probes the pendent blossoms, searching to their inmost depths. The nest of this species is hung to the end of a twig, to which it is woven with marvelous skill, and its whole construction is very beautiful.

The adult male bird is colored as follows: The head and the upper part of the body are green, glossed with gold in some parts and with bronze in others, the tints changing according to the light. The wings are dark black-brown with a purple gloss, and the tail is dark black, bronzed on the upper surface. Behind each eye is a small but conspicuous white spot slightly elongated, and there is a broad crescent-shaped mark of light green on each side of the neck. The under parts are of a bronze green, and the under tail coverts are flecked with a little white. The female is of much the same color as the male upon the upper parts of the body, except that there is a little white upon the lower part of the back and a narrow white line behind the eye. The throat is brown, each feather being slightly edged with gray, and there is a very faint indication of emerald green on part of the throat. The young male is much like the female, but is more coppery in his hues. The throat is white, speckled with brown, because each feather is white with a brown tip. At each side of the throat there is a large patch of green intermingled with white.

Correspondence.

Colored Lights in Parlor Theatricals.

To the Editor of the Scientific American:

Having occasion to assist in getting up a series of tableaux, considerable difficulty was encountered in securing a satisfactory light. Living at some distance from New York, a calcium light was difficult to procure, and, moreover, too expensive. The use of gas and reflectors had been suggested. Procuring two 14 inch glass reflectors, I experimented with gas, with poor success. While the amount of light reflected was unsatisfactory, the interposition of a sheet of colored glass, or even a film of gelatine, sensibly diminished its volume.

Compelled to fall back on colored fires, I constructed a furnace of tin at small expense, that succeeded beyond expectation. A tin cylinder, 18 inches in diameter, was opened out at the side to admit a pane of glass, 16 x 24 inches. This glass, fastened securely in its place, constituted one side of the box, the curved inner surface of bright tin served as a reflector. A sheet iron bottom and an 8 inch heater pipe, leading from the top of the cylinder out through a convenient window into the open air, completed the apparatus. At the back of the box was constructed a sliding door large enough to freely admit the hand and closing tightly.

The peculiarity of the apparatus was:

1st. The large smoke pipe which was necessary to conduct rapidly away the large volume of smoke generated; and,

2d. The box was made as nearly as possible *air tight*. The chlorate of potash furnished all the oxygen necessary for combustion, and all the air necessary for draught was admitted through the slide door, which could be closed quickly upon any indication of a back draught.

The following formula for red fire gave the best results:

Powdered nitrate of strontia	8 ounces.
Powdered chlorate of potash	4 "
Shellac in coarse powder	2 "
Lycopodium	½ ounce.

This mixture burns slowly, gives a good light, contains no sulphur, and can be prepared by any druggist.

By placing the fire in tin troughs, 8 or 10 inches long, the amount of light and length of burning can be regulated to a nicety, and by alternating red, blue, and green in the same trough, these colors can be exhibited in any desired succession.

In a furnace of this description I burned colored fires for an hour without the slightest disagreeable odor being perceptible in the room. Hoping my experience might prove of value to some of your many readers, I remain,

Yours truly,

W. K. Roy.

Wappinger's Falls, N. Y., December 11, 1880.

Indian Ethnology.

Major J. W. Powell, Chief of the Bureau of Ethnology, Washington, lately gave to the *Republic*, of Omaha, Neb., information to the effect that there are now eight official parties in the field engaged in making a study of the North American Indians—their condition, their habit of life, their languages, their history, etc., as well as taking a census of them. These parties, who are roughing it with tents, mule teams, etc., are scattered throughout California, Nevada, Utah, New Mexico, and Arizona, and Major Powell was then on his way to visit them all to ascertain personally how they are progressing with their work. The taking of the Indian census was begun October 1, and will probably not be finished until next spring, owing to the scattered locations of the various tribes. The name of every Indian is written out in full, together with age, sex, etc., and other statistics are obtained, just the same as of the civilized citizens of the United States, so far as practicable. Besides these eight ethnological parties who are doing this work, there are special agents of the Census Bureau who are assist-

ing with the various Indian agents. It is estimated that the total number of Indians in the United States will foot up over 300,000. One of Major Powell's parties has just discovered in New Mexico and Arizona a number of old ruins and pueblos, which means old Indian villages. These are now being carefully explored. In New Mexico they have discovered, west of Santa Fé, the largest collection of ruins ever found on this continent.

Sea Elephants at Heard Island.

Heard Island is a barren formation 25 miles long, 6 miles broad, area 80 square miles, a considerable portion covered with glaciers. It is situated in about lat. 53° 10' S. and long. 73° 30' E., being about 2,500 miles southeast of the Cape of Good Hope, and 300 miles south of Kerguelen's Land. Heard Island is of volcanic origin. In the central part of the island a mountain, known as Big Ben, rises to a height of 7,000 feet. The island was visited by the steamer Challenger in 1874, and Mr. H. N. Moseley, in his "Notes by a Naturalist on the Challenger," gives the following particulars relating to sea elephants, which are found there in great abundance.

The sealers said that the climate of Heard Island was far more rigorous than that of Kerguelen's Land.

In winter the whole of the ground is frozen and the streams are stopped, so that snow has to be melted in order to obtain water.

In December, at midsummer, there is plenty of sunshiny weather, and Big Ben is often to be seen.

It is possible to land in whaleboats, on the average of the whole year, only once in three days, so surf-beaten is the shore, so stormy the weather.

We saw six sealers. Two were Americans, and two were Portuguese, from the Cape Verde Islands.

They were left on the island by the whaling vessels which we met with at Kerguelen's Land, their duty being to hunt sea elephants.

The men engage to remain three years on the island, and see the whale ships only for a short time in the spring of each year. On the more exposed side of the island there is an extensive beach, called Long Beach.

This is covered over with thousands of sea elephants in the breeding season, but it is only accessible by land, and then only by crossing two glaciers, or "icebergs," as the sealers call them.

No boat can live to land on this shore, consequently men are stationed on the beach, and live there in huts, and their duty is constantly to drive the elephants from this beach into the sea, which they do with whips made of the hide of the elephants themselves.

The beasts thus ousted swim off, and often "haul up," as the term is, upon the accessible beaches elsewhere, and there they are killed, and their blubber is taken to be boiled down.

In very stormy weather, when they are driven into the sea, they are forced to betake themselves to the sheltered side of the island, hence the men find that stormy weather pays them best.

Two or three old males, termed "beach masters," hold a beach to themselves, and cover it with cows, but allow no other males to haul up.

The males fight furiously; and one man told me that he had seen an old male take up a younger one in his teeth and throw him over, lifting him in the air.

The males show fight when whipped, and are with great difficulty driven into the sea. They are sometimes treated with horrible brutality.

The females give birth to their young soon after their arrival. The new-born young are almost black, unlike the adults, which are of a light slate brown, and the young of the Northern bladdernose, which are white.

They are suckled by the female for some time, and then left to themselves lying on the beach, where they seem to grow fat without further feeding. They are always allowed by the sealers thus to lie, in order to make more oil.

This account was corroborated by all the sealers I met with. I do not understand it. Probably the cows visit their young from time to time unobserved. I believe similar stories are told of the fattening on nothing of the young of Northern seals.

Peron says that both parent elephant seals stay with the young without feeding at all, until the young are six or seven weeks old, and that then the old ones conduct the young to the water and keep them carefully in their company. The rapid increase in weight is in accordance with Peron's account.

Charles Goodrich gives a somewhat different account, namely, that after the females leave the young, the old males and young proceed inland, as far as two miles sometimes, and stop without food for more than a month, and during this time lose fat.

The male elephants come on shore on the Crocets for the breeding season at about the middle of August, the females a little later.

There was said to be forty men in all upon Heard Island. Men occasionally get lost upon the glaciers.

Sometimes a man gets desperate from being in so miserable a place; and one of the crew of a whaler that we met at Kerguelen's Land said, after he had had some rum, that occasionally men had to be shot; a statement which may be true or false, but which expresses, at all events, the feelings of the men on the matter.

The men that we saw seemed contented with their lot. The "boss" said, in answer to our inquiries, that he had

only one fur seal skin, which he would sell if he was paid for it; but he guessed he'd sell it anyhow when he got back to the States.

He had been engaged in sealing about the island since 1854, having landed with the first sealing party which visited the island.

For his present engagement his time was up next year, but he guessed he'd stay two years more.

He'd make five hundred dollars or so before he went home, but would probably spend half of that when he touched at the Cape of Good Hope on the way. The men had good clothing, and did not look particularly dirty.

They lived in wooden huts, or rather under roofs built over holes in the ground, thus reverting to the condition of the ancient British.

Around their huts were oil casks and tanks, and a hand barrow for wheeling blubber about. There were also casks marked molasses, flour, and coal.

The men said they had as much biscuit as they wanted, and also beans and pork, and a little molasses and flour. Their principal food was penguins (*Eudyptes chrysopolus*), and they used penguin skins with the fat for fuel.

Captain Sir G. S. Nares saw five such skins piled on the fire one after the other in one of the huts.

MISCELLANEOUS INVENTIONS.

A tool for holding small articles or pieces of jewelry while being soldered, so as to dispense with binding wire, plaster of Paris, and the various inconvenient, troublesome, and dirty contrivances hitherto used in such work, has been patented by Mr. Louis G. Grady, of Halifax, N. C. This invention consists in a bar or plate provided with articulated arms that carry tweezers, the parts being so constructed and arranged that the articles or parts can be placed in the tweezers and brought together and held in any required position for being soldered.

An improved time signal for railways has been patented by Mr. Horace A. Wayne, of Manlius Station, N. Y. The invention consists in the combination of a clock with hands and dial as usual, and a clock movement without an escapement, that moves the hands of the indicating dial, and having a stop lever that is released by the passing train, the two clocks being so connected that the indicator remains immovable until a train passes, when it is released and moves until its hands catch up with or indicate the clock time, and it is again stopped.

Mr. Oliver Bryan, of New York city, has patented a hot air furnace, so constructed that the air when heated will be pure, the heating surfaces can be readily inspected and cleaned, and the fire will act instantly and uniformly upon all the heating surfaces, making the expansion equal and the radiation of heat quick and regular.

Mr. Abraham Mayer, of New York city, has patented an improved optometer or instrument for ascertaining the number and kind of glasses required by persons having an impaired sight, making the use of spectacles necessary. The invention consists in a case containing one or more sets of lenses arranged on an endless band in such a manner that a standard card, which is held on the end of an adjustable pivoted arm, can be read through the several lenses successively, so that the lenses suiting the eyes of the experimenter can be determined very easily and rapidly.

An improved furnace for burning chaff, etc., has been patented by Mr. Alonzo Moore, of Bangkok, Siam. In ordinary furnaces fuel is usually supplied at intervals, which chokes to a considerable extent the evolution of gases from the combustion. In so supplying the fuel the boilers are exposed to sudden changes of temperature, causing injurious expansions and contractions. To overcome these objections is the object of this invention.

Mr. H. L. Warren, of Alma, Ohio, has patented a fan blower for thrashers, by the use of which the feeders and band cutters will be protected from the cloud of dust that constantly issues from the mouth of the machines.

Mr. James R. Barry, of Yonkers, N. Y., has patented a combination puzzle and game apparatus, which consists of a short rod, a stationary handle, and four or more balls or short cylinders having alternate numbers and letters formed upon them in such an order that when the balls are arranged in a particular position the sum of the various columns of numbers will be the same, and the various columns of letters will spell words.

A harness buckle, the tongue of which may be locked upon the buckle frame, and of such construction that the pull of the engaged trace or strap shall be straight, and not at an angle thereto, has been patented by Messrs. Casper L. Marschall and Anthony Marschall, of Evansville, Ind.

A calendar, to be attached to a clock and operated in connection therewith, and exhibits but one number or date at a time, and that number or date in large or plain figures, has been patented by Mr. Peter Wagner, of New York city.

An improvement in the tunnels of base burning stoves, whereby the coals can be retained in the tunnel in case a weak fire is desired or in case the fire has gone out and the ashes and cinders are to be removed, so that the coal in the tunnel can be dropped on to a fresh fire, has been patented by Mr. Edward C. Smith, of Lincoln, Neb.

Mr. Charles L. Shaw, of Nora, Ill., has patented an improvement in flood gates for streams, hollows, and lowlands liable to be overflowed by a sudden rise of water. They are so constructed that they will not wash away, and will allow the water, and any rubbish being carried down by the water, to pass freely.

Mr. Marshall Pratt, 55 Beekman street, New York city, is introducing a novel, efficient, and cheap razor strop, consisting of a finely grooved wooden strop saturated with a fixed oil and coated on both sides with an improved paste.

Mr. Timothy B. Rider, of Fitch Bay, Quebec, Canada, has patented an improvement in the class of automatic safety attachments for steam boilers whose function is to dampen or extinguish the fire by allowing escape of water from the boiler into the fire box in case the water becomes too low or the steam pressure too high for safety. The inventor employs a tank containing a float and lever which operate a valve that controls escape of water to the fire box, as heretofore, but he has so constructed and arranged these parts as to make the apparatus more compact, less liable to get out of order or become inoperative, and more efficient generally.

An improved disk mill for crushing and grinding different materials has been patented by Mr. Carl Fink, of Berlin, Germany. This apparatus, it is said, operates much more rapidly and easily than vertical millstones or ordinary crushing mills, and the disks can be cooled in a more efficient manner than the stones or rollers of ordinary mills.

Mr. W. Clay Lutz, of Bedford, Pa., has patented an improvement in that class of railroad cross ties in which the material used is metal.

Messrs. Hermann Koeller, of New York city, and Charles Nimmo, of Greenpoint, N. Y., have patented an improved drip oil cup. The object of this invention is to provide an improved oil drip cup for the crank connections of steam engines and other mechanism, which can be adjusted to fit any connection, and not only catches the oil that drops from the journal, but also the oil or grease that is thrown from the crank connection by centrifugal force.

An improvement in the class of dogging apparatus which is affixed to one of the knees of a head block of the log carriage, has been patented by Mr. William J. Wickham, of Forest Home, Texas.

Mr. Frederick Koskul, of Grand Rapids, Mich., has patented a process of treating metallic foil to form veneers, which consists in, first, painting or lacquering it; secondly, varnishing it; thirdly, baking it; and fourthly, subjecting it to pressure.

An improvement in steam boilers and furnaces has been patented by Mr. Joseph E. Culver, of Jersey City, N. J. The improvement relates to steam generators wherein the heated products of combustion may be commingled with the steam for use with an engine, or for heating purposes, or used separately.

Mr. Jacob R. Scott, of Nyack, N. Y., has patented improvements which relate to machines for sewing boots and shoes of the class wherein a rocking looper is fitted in the horn. The object of the invention is to provide means whereby the looper will always be held in the proper position relative to the needle while the horn turns.

New Plan for the Drainage of Chicago.

A committee appointed by the Citizens' Association, of Chicago, to devise a system of improved drainage adapted to the present and future needs of the city have reported in favor of a vast sewer to drain the entire district traversed by the Chicago River. The estimated cost of the work is \$6,850,000, but it is thought that to complete it in every respect the sum of \$12,000,000 will probably be necessary. The line of the proposed sewer, as shown in the map made by the engineer of the committee, Mr. A. J. Mathewson, is as follows: Commencing at the mouth of the Regula or Mud Lake fork of the south branch of the Chicago River it runs west through the lake toward the Desplaines River north of Summit; then curving to the left it passes in a southwest direction between the canal and the river to Mount Forest, Willow Springs, Sag Bridge Station, and Lemont to the Romeo bend of the canal, Norton's tail race at Lockport, and to a point opposite lock No. 1 at Lockport; thence to a point at the head of the pond of dam No. 1, Joliet, a few hundred feet northwest of Lock No. 4, of the Illinois and Michigan Canal, a distance not far from 3 1/2 miles.

For the southwestern terminus the sewer runs about 2 1/2 miles N.N.E. to a point opposite Lock No. 1, with a fall to the south of about 12 feet in bottom of sewer, or 4 3/8 feet fall per mile, and the average width of 15 feet; thence north and northeast, past Romeo and Lemont, Sag Bridge Station, Willow Springs, Mount Forest, Summit, and Mud Lake, or regular route, touch Bridgeport, a distance from Lock No. 1 of 20 miles, and an ascent of 1 foot per mile, making 20 feet fall from Bridgeport to Lockport in bottom of sewer, with a width of sewer at lower end of 20 feet, and at upper end of 49 feet for compensation.

Good, substantial abutments and bridges at all crossings will be necessary throughout, and at Big Run, Norton's tail race, and Fraction Run an arch about 300 feet long, in each, will be needed to let the water from these several places pass over the top of the sewer. The eastern portion of this route is already excavated to about the proper width, but not to the proper depth. The sewer when completed should draw water from the surface to the bottom of the river, low water, datum line for the first 29 miles. A portion of West Chicago and the town of Cicero, under an arrangement with the city, may drain directly into the main sewer. The amount of excavation for the above sewer, by a careful approximate estimate will be 3,031,285 cubic yards; cost of excavation—earth and rock, slope wall, inverted arch in bottom, and the three arches aforesaid, \$6,365,693; contingencies, engineering, etc, \$483,625; total cost, \$6,849,323.

New Memphis.

The Memphis *Avalanche* declares that all sanitarians who have examined the successful working of the new sewer system of that city, and who are familiar with the sanitary condition of other American cities, agree that Memphis is the best sewer and best drained city on the continent. The absence of sewer gas, the abolition of all privy vaults, and the thorough underdrainage of the soil, are marked features of the Memphis sewer system that are lacking in other cities. The effect of this thorough sanitary revolution, the *Avalanche* continues, cannot but have a marked influence in decreasing the mortality rate, and it may confidently be anticipated that Memphis will hereafter be entitled to be styled not only the cleanest but the most healthy city on the continent.

How many other American towns and cities are waiting, as Memphis did, to be depopulated and threatened with general bankruptcy in business as well as in health, by repeated epidemics, before adopting an adequate system of general sanitation?

The Atlanta Cotton Fair.

A grand international exhibition of the appliances and machinery used in raising, preparing, and manufacturing cotton, with samples of cotton fiber and fabrics, and all other matters bearing upon the cotton interests, is announced to be held in Atlanta, Georgia, during October and November next. At a large and enthusiastic meeting of business men in Atlanta, December 2, the International Cotton Exhibition Association was organized with the following named officers: President, Senator Joseph E. Brown, of Georgia, and twenty-five vice-presidents from the principal cities and manufacturing towns of the country; Treasurer, Samuel M. Inman, of Atlanta; Secretary, John W. Ryckman, of Philadelphia; Executive Committee, the Mayor of Atlanta, *ex-officio*, Chairman, H. J. Kimball, R. F. Maddox, W. I. Calhoun, B. E. Crane, W. H. Patterson, M. C. Kiser, Evan H. Howell, and W. B. Cox, of Atlanta; Edward Atkinson, of Boston; Richard Garsed, of Philadelphia; Cyrus Buzby, of New Orleans; J. W. Paramore, of St. Louis; John H. Inman, of New York. The Finance Committee are: Robert J. Lowry, Paul Romare, and D. N. Spear, of Atlanta; Morris Ranger, of New Orleans; Thomas Dolan, of Philadelphia; William A. Burke, of Lowell, Mass.; William Gray, Jr., of Boston, Mass.; and J. H. McMillen, of Biddeford, Me.

The Adirondack Survey, New York.

The year's field work of the Adirondack Survey, under Mr. Verplanck Colvin, was ended December 1, when the superintendent and his assistants returned to Albany. The last triangulation station was on Bluebeard Mountain, near Lake Pharaoh. The mountains had been covered with snow for two months; very heavy snowfalls occurred about the middle of October.

The measurements of the season extend the work to the southeastern borders of the Adirondacks, and cover the location of a great number of trigonometrical stations in the counties of Essex, Hamilton, Warren, and Saratoga, and the northeast corner of Washington County. The heights of a great number of mountains, until now unmeasured, with altitudes of lakes and other new prominent points in those counties, have been determined, measurements of vast numbers of air-line distances for the purpose of locating signals, mountain lakes, and land lines have been made, together with special surveys of lakes and rivers. A full account of these new measurements will be given in Superintendent Colvin's next report to the Legislature.

Wickersheimer's Preserving Fluid.

According to the *Boston Journal of Chemistry*, the following is said to be the formulæ now adopted by prominent manufacturers in Berlin for this liquid, according as it is to be used for injecting or immersing bodies:

	For injecting.	For immersing.
Arsenious acid	16 grammes.	12 grammes.
Sodium chloride	80 "	60 "
Potassium sulphate	200 "	150 "
Potassium nitrate	25 "	18 "
Potassium carbonate	40 "	15 "
Water	20 liters.	10 liters.
Glycerine	4 "	4 "
Wood naphtha	3/4 liter	3/4 liter.

Hager suggests the following as a substitute for Wickersheimer's preparation:

Salicylic acid	4 drachms.
Boric acid	5 "
Potassium carbonate	1 drachm.
Dissolved in hot water	12 1/4 ounces.
Glycerine	5 "

Then add—
Oil cinnamon, oil cloves, each 3 drachms, dissolved in alcohol

12 1/2 ounces.
The latter fluid is not poisonous, and possesses the desirable property of acting as an antiseptic, and also as a preventive and exterminator of moths and vermin, and is possessed of a pleasant odor. The borosalicylate may be used in connection with other solvents if desired.

Progress in Silk Manufacture in America.

During a recent visit to the silk mills of Paterson, N. J., Mr. Brocklehurst, of Macclesfield, England, a member of one of the largest silk manufacturing firms in the world, was much impressed by the rapid progress which the silk industry is making in this country. He was especially surprised by the general use of steam power looms in weaving the more delicate and costly fabrics, an improvement only now being tried experimentally in England, and by the wide scope and variety of the work done in each and all the mills.

A Big Melon Patch.

Missouri boasts of possessing one of the largest and most productive melon patches in the United States. It is situated on the borders of Scott and Mississippi counties, and equals if it does not exceed in size and adaptation of soil and climate the famous melon patches of Georgia, Indiana, and the eastern shore of Maryland. The *St. Louis Republican* describes it as a tract of sandy prairie, four miles wide and ten miles long, with a thin, warm soil, just adapted to the cultivation of the melon, and such melons as are raised nowhere else in that region. There is much richer and deeper soil all around there, but it is not adapted to melon culture. This land is capable of producing 1,000 melons to the acre. At a place called Diehlstadt, in Scott County, there were shipped the past season 439 car loads of 1,000 to the car, and Bertrand, in Mississippi County, shipped 180 car loads, mostly to Chicago. The melon county was visited by 25 commission merchants from Chicago, who paid as low as \$40 and as high as \$140 per car load, being an average of \$70 per car, the market price varying with the advance of the season and the number of melons ripening at the same time. Most of these melons were shipped over the Cairo and Vincennes and Illinois Central Railroads in fruit cars, properly ventilated and arranged for the purpose. These melons found their way not only to St. Louis and Chicago, but to most of the lake cities, and even to New York and Philadelphia.

Melons are getting to be such a staple of production that the cultivators are asking for increased railroad facilities to move the product at the proper season, and recently the Hon. Henry J. Deal, the newly-elected member of the Legislature from Charleston, Mississippi County, applied to Superintendent Soper, of the Iron Mountain Railroad, with a petition numerously signed, representing that they will plant 700 acres more next year in melons if the railroad will give them a side track and station at a point on the Iron Mountain Railroad three miles north of Charleston, to be called Melon Station. Mr. Soper gave assurance that he would comply with the request of the petition. Col. Deal estimates that 700 acres ought to produce 700 car loads, at the rate of 1,000 melons to the acre, making 700,000 melons. One man can attend to twenty-five acres of melons. The variety of seed used is that of the Georgia melon, which is very luscious and grows to a great size, some weighing as high as 60 pounds. The hills are planted 14 feet each way apart and from three to four seed are put in a hill. They commence shipping melons about the 20th of July, and continue to the last of August.

Spontaneous Combustion of Soft Coal.

The Boston Manufacturers' Fire Insurance Company states that at present rates of prices semi-bituminous and soft coals are coming into more general use than they have been, especially culm or fine coal.

Members are warned that, with few exceptions, such coals are very liable to spontaneous combustion, if stored when the least wet or damp in closed sheds where there is little or no circulation of air. If such coal is not protected from being wet, it is said to deteriorate.

The company objects to the storage of semi-bituminous or bituminous coal in or under any building covered by its policies, or in or under any building that would expose a risk taken by this company to danger if it took fire.

It is suggested that a roof may be sufficient to protect soft coal from being much wet, and that, under a roof not confined at the sides, there would probably be such a free circulation of air as to prevent spontaneous combustion.

Photography in Engineering Works.

Photography has been employed by our large engineering and manufacturing firms for a long time. An English photographic journal speaks of some of their engineering establishments having photographic studios attached to their works, as if it was a new thing. Referring to those having such a department, the editor says Sir William Armstrong, at Elswick, and Sir Joseph Whitworth, at Manchester, may be cited among others; while the eminent firm of gun-makers, Krupp & Co., in Westphalia, employ not only a photographic staff, but practice collotype printing and other elaborations of the photographic art.

Mercantile Shrewdness.

The London *Hatters' Gazette*, referring to the fact that China grasshats, which an American manufacturer had tried to introduce last season, but which proved an utter failure, adds that they have turned their large stock to a fresh use, and are advertising them as wall pockets. The brims are lined with satin of a bright color and gayly trimmed, and the crown is made to hold a whisk broom and other odds and ends. Trust a Yankee, naively adds the *Gazette*, for sitting down with a dead stock of a novelty which has failed to take!

Shipment of Bees to New Zealand.

Recently four colonies of bees were shipped from California for New Zealand. Each of the boxes in which they were to make their long journey was provided with an attachment at one side carrying a sponge, by means of which the bees were to be supplied with fresh water daily and the atmosphere of the hive kept sufficiently humid. Ventilation was provided for by openings covered with wire cloth and fitted with sliding doors; and a wire-covered cage was attached to each hive for a cooling place for the bees in case the interior of the hive becomes too warm.

A Locomotive to Run Eighty Miles an Hour.

The Baldwin Locomotive Works have just entered into a contract with Col. G. A. L. Roberts, of Titusville, for the construction of a passenger engine which will be able to run eighty miles an hour, and maintain this rate of speed for 100 miles without stopping. The locomotive is to weigh 38 tons, and will comply with standard gauge. The driving wheels will be six feet in diameter. The forward trucks and those on the tender will be made of paper, which, it is said, will endure more strain and wear than iron or steel. The wheels will all be of the pattern known as the broad-tread, which will enable the engine to run on roads of either 4 feet 8½ inches or 4 feet 10 inches gauge. The most important feature of the locomotive will be the introduction of the Roberts patent cylinder and piston, which has proved capable of saving at least 20 per cent in steam pressure. The exhaust ports are in a continuous circle around the cylinder, in addition to the usual ports at the ends, and the steam escapes without the waste of force necessary to expel it, as in the cylinders of the old style. The tender will be so constructed as to carry a foot of water under the coal, as well as the usual amount on the sides. There will be a water chamber on the locomotive so arranged that compressed air from the air pump can be admitted in the top of the chamber upon the water, by which means a stream may be forced upon any hot bearing connected with the engine or tender. This is expected to overcome the trouble of hot boxes. The nozzles through which the steam is to pass and create a draught will be eight inches in diameter—about three times the usual size—and the boiler will be the largest that can be put upon the standard gauge tracks. It will be the strongest locomotive ever built, and perfect in every detail. Col. Roberts, the inventor, built a similar locomotive a few years ago, which drew the fast mail train over a portion of the Lake Shore Railway, but it was not a success, owing to its poor construction. The improvements it suggested will be taken advantage of in building the new engine. It is stated that Col. Roberts, who has visited Europe several times, and studied the railway systems of that country, is building his new engine for use upon the European Continent.

Tennessee Marble.

Mr. John J. Craig, of Knoxville, Tennessee, says that the United States Government has recently opened and is now working successfully a quarry of white stone in the immediate vicinity of that city which is pronounced by competent judges to be superior to anything of the kind found elsewhere in the United States for building and all out-door purposes. It is a highly crystallized limestone marble—and as it comes from the hammer or chisel is almost perfectly white; when polished it shows a faint pinkish blush, most delicate and beautiful; long exposure to the atmosphere seems to whiten and harden it, a sort of glass-like enamel forming over its surface and rendering it almost entirely impervious to dampness and stains of any kind. A column of this marble, which has been standing in Knoxville more than thirty years, and which has never been touched with brush or soap, is as white and clean to-day as it was the day it was first exposed to the storms and sunshine of our fickle climate. The texture and working quality of the marble is unsurpassed. It is neither too hard nor too soft, but exactly soft enough to allow the sculptor to work it without force and trace on it the finest lines of finished form, and yet hard enough to retain these lines in all their original delicacy, unimpaired by wind and rain, for generations to come. The quantity of the marble is unlimited. Knoxville is surrounded by whole mountains of it. Facilities for transportation are now good and daily growing better. Car loads are being daily shipped to all sections of the country, and the absence of capital alone prevents the quarrying of it from soon developing into one of the most important industries in that singularly favored but as yet almost unknown section.

The Paterson, N. J., Artesian Well Strikes Salt Water.

In the SCIENTIFIC AMERICAN of January 31, 1880, an account was given of the progress of the artesian well of the Passaic Rolling Mill until quicksand was struck at the remarkable depth of 1,100 feet. The well was piped through the quicksand and the boring continued. At a depth of 2,000 feet water was struck, the well having previously been so dry below the quicksand that water had to be poured in to lubricate the drill. The boring was continued to a depth of 2,053 feet, the water increasing in volume until it rose to within 32 feet of the surface. But this water was salt. Samples were sent to Prof. Cook, the State Geologist, who caused an analysis to be made. This showed that the water contained 974 grains of various salts to the gallon, about half of which was common salt. There was also a considerable percentage of chloride of calcium and magnesium, about 7 per cent of chloride of potassium, and considerable sulphate of lime, with mere traces of iodine and bromine.

Prof. Cook says he does not know what this water can indicate, unless it be that the well has got down pretty near to rock salt. From recent indications it appears probable that if the well were continued still further the water would flow out of the top, but as the company has no use for salt water in rolling and working iron it has been decided to abandon the project of securing a flowing well. The hole will be plugged below the quicksand, or about 1,120 feet below the surface, and the water will be pumped, an abundant supply of fresh, cool, and pure water being assured at that point.

The Yuba River Brush Dam.

The Marysville (Cal.) *Appeal* describes as follows the construction of the dam across the Yuba River, nine miles above Marysville, to restrain the mining *débris* and to improve the river channel. An excavation was made about one foot in depth and sixty feet wide, the ground at that depth being frequently very solid. This excavation was made across the whole distance. In this were trenches in which were placed logs spliced together at the ends and securely staked down. A mattress was then made upon an inclined scaffolding. Willow brush was laid on the scaffold, butt ends and tops alternating so as to be close together and bind well, there being enough large brush to hold the mass and enough small and short to fill all the space. None but assorted straight willow brush was used anywhere, those pieces with wide or spreading branches being cast away. This mattress, about sixty feet in width and two feet in thickness, was then sewed together with strong wire until it was pressed to one foot in thickness. The frame or scaffold was drawn from under by horses, and the dense mass sunk upon the stringers and was sewed down to them and otherwise securely fastened. Though the mattress was necessarily made in pieces, these were all sewed together at the ends, making it continuous. This was all covered with two feet of earth, and continued driving over it has packed the ground. This is intended to prevent the wash from the water that flows over or through the dam.

On top of the mattress and earth, but a few feet below the upper edge of it, begins a layer of logs laid together closely, sewed with wire and sewed to the mattress beneath. On this are stringers and then two more layers of logs, all with butts down stream and top ends running into the ground up stream. They were all secured in the same manner to the mass below and loaded with dirt. The line of the butt ends of each successive layer is further up stream, of course, forming a sort of stairway from the bottom. Earth and sand are used to fill all the crevices. The length of the dam is between 10,000 and 11,000 feet, or nearly two miles, and it averages eight feet in height. There is no part of it that is not firmly wired to every other part. Statistics are not generally very effective in description, but some idea of the way in which it is all matted together may be given by the statement that considerably more than 100 miles of wire has been used, and, independent of brush, there are in the structure just 117,400 logs, averaging six inches in diameter at the butt and thirty feet in length.

Though the distance between the highlands on either side of the basin is about two miles, the present channel of the river is comparatively narrow. To connect the two sections of the dam the channel had to be vacated by turning the course of the river by the construction of a wing dam of brush across the channel a quarter of a mile above the gap. The capacity of the first attachment basin is equal to 75,000, 000 cubic yards of *débris*. When filled to the level of the dam, another dam will be built on the top of the first and so on.

A Gigantic Iron Pier Pound-net Proposed.

The Long Island Fish Company, of this city, proposes to engage in pound fishing on a scale hitherto undreamed of. Already a large tract of land has been purchased at the eastern end of Long Island, extending about a mile along the coast. At this point, which is eminently favorable for pound fishing, since the fish that run along the coast here come very close to the shore, the company propose to construct a gigantic weir supported by iron piles, forming an iron pier 700 feet long and ten feet wide, with bents or sections twenty feet long. At the outer end of the pier, in thirty feet of water, will be a heart-shaped pound, the large end of the heart inshore. This heart will be about seventy feet across, and outside of it is to be a box of iron piles and netting about seventy-five feet square. The fish coming from either direction and striking the pier netting will run out seaward to the heart, and, passing out at the lower end, will find themselves in the outer receptacle. In the sections of the iron weir storage for thousands of tons of fish can be provided, where they will keep alive in their native element for a month or longer, and need not be immediately brought to market when the price is low.

The great advantage of an iron weir lies in its stability and freedom from attacks by worms. The netting fence runs down to the bottom of the water so as to stop ground-swimming fish. The pound has a net bottom, and when filled with fish is lifted and the fish dipped out with hand nets.

Piers at French Ports.

The construction of a new pier has just been commenced at Nice, and it is expected that it will be finished and opened to the public in about two years from the present time. The total area of the pier and pier-head will be 65,000 square feet, and the piles at the pier-head will be in water varying from 26 feet to 33 feet deep. On account of the absence of the tide in the Mediterranean and the rapidly increasing depth of the water, the length will be 300 feet, but the building on the pier-head, according to a correspondent, will be larger, more substantial, and of a more ornamental character than is usually the case with English piers. It will contain a large central hall, or concert room, a restaurant, billiard room, and all other necessary adjuncts of a casino, and the arrangement of the bracing under the pier-head is especially designed to give ample space for two large swimming baths. Under the same auspices the construction of piers will soon be commenced at Cannes, Dieppe, and Trouville.

NEW INVENTIONS.

Mr. John C. Wharton, of Nashville, Tenn., has patented an improved shelving which is dust proof and exhibits the articles placed thereon to the greatest advantage, and is also ornamental. The invention consists in a series of shelves provided with glass fronts, forming closed boxes or compartments, which are arranged in such a manner that each shelf projects beyond the next lower one, thus permitting receptacles containing the article to be exhibited to be placed upon the shelves through apertures in the bottom thereof. The receptacles are provided with some suitable locking device for holding them on said shelves.

An improvement in electric lamps has been patented by Mr. John H. Guest, of Brooklyn, N. Y. The object of this invention is to furnish means for automatically regulating the length of the arc in electric lamps, and to prevent fluctuations in the light by changes in intensity of current. It consists, primarily, in a thermoscopic rod combined with an electric lamp for expansion according to the intensity of the current and resistance in the circuit. The lineal expansion is multiplied by levers, which act by clamps to separate the carbons.

Messrs. Robert Quintavalle and Theodore Lindberg, of Brooklyn, N. Y., have patented an improvement in the class of fire escapes adapted to be suspended from a window of a building. It is more particularly an improvement upon such apparatus as consists of a frame that is designed to be attached to a window-sill, and is provided with a curved standard, from which a basket or other receptacle for persons and goods is suspended by means of a rope running through a sheave or pulley block.

Mr. George Oliver, of the City Road, County of Middlesex, England, has patented an improved apparatus for enabling a performer to ascend to or descend from a considerable height from a stage or platform, either in a vertical or oblique direction, as may be required, or for personating a bird, for instance, or other character suspended in mid-air.

An improved clasp for pocketbooks, satchels, etc., which is simple and convenient, has been patented by Mr. John G. Klett, of Brooklyn, N. Y. The invention consists in a spring plate provided with a knob or button, and with flanges on the opposite ends, one of the flanges being securely attached to one part of the frame of a pocketbook, satchel, etc., while the other catches on a stud on the other part of the frame, or catches on the edge of the frame itself.

An improvement in stereotype casting boxes has been patented by Mr. William E. Gump, of Brooklyn, N. Y. The object of this invention is to secure adjustable gauges to a casting box, and do away with the separate frames between the lids of the box, so as to save time, labor, and cost.

An improved oil stove wick-trimmer has been patented by Messrs. Martin W. Walker and George E. Williams, of Sing Sing, N. Y. In ordinary oil-burning stoves it is necessary to remove the top of the stove and the utensils on it to trim off the crust that forms on the wicks and interferes with the proper action thereof. The object of this invention is to avoid the inconvenience attendant upon this process of removing the crusts on the wicks.

Mr. Conrad Blattner, of St. Louis, Mo., has patented an improved permanent roll for a detachment of troops, the members of a police force, or other organized body, designed to indicate at a glance the absence, presence, physical condition, character of duty engaged in, etc., of each and every member of the body.

An improvement in dental forceps has been patented by Mr. William P. Tisdale, of Pass Christian, Miss. The invention consists in a rod bifurcated at one end and a rod that has a head embracing the elastic prongs or bifurcations, so as to open and close the jaws which form a part of the prongs, the slide rod being operated by a hand screw.

Mr. William J. Ormsby, of Cincinnati, O., has patented an improvement in that class of air-carbureters in which the tank or reservoir containing the gasoline or other carbureting liquid is placed above but in communication with the pans or trays intended to receive from time to time a limited portion of the liquid, and through which the air to be carbureted is successively passed.

An improved device for removing vitiated air from dwellings and other buildings by the vacuum process, has been patented by Mr. James F. Baldwin, of Lockport, N. Y. It is adapted for connection with a stove, stovepipe, or flue, and may be placed on the floor or otherwise suitably arranged within the room to be ventilated, and the air is drawn into it and it passes into the pipe, a current being induced by the draught in the chimney.

An improved machine for crushing, grinding, and pulverizing the valuable ores in order that by comminution the metallic portion may be separated from the gangue, has been patented by Mr. Royal C. Grant, of Middleport, O. This machine is of that class in which a tapering or cone-like shell revolves around a core of corresponding shape.

A cheap, simple, and efficient apparatus for generating or producing illuminating gas, has been patented by Mr. Geo. H. Burrows, of Somerville, Mass.

Mr. John Q. Crosby (Hezekiah H. Crosby, administrator), of Yonkers, N. Y., has patented an improvement in the class of teels having an iron frame provided with pivoted braces or legs adapted to be folded for the purpose of transportation, etc. The invention relates to the construction of and means for locking the reel proper or the revolving part on which the hose is wound; also, to the construction of the holder for the nozzle of the hose.