Scientific American.

ESTABLISHED 1845.

MUNN & CO., Editors and Proprietors.

PUBLISHED WEEKLY AT

No. 361 BROADWAY, NEW YORK.

O. D. MUNN. A. E. BEACH.

TERMS FOR THE SCIENTIFIC AMERICAN.

One copy, one year, for the U. S., Canada or Mexico.....$3 00
One copy, six months, for the U. S., Canada or Mexico..... 1 50
One copy, one year, to any foreign country belonging to Postal Union. 4 00
Remit by postal or express money order, or by bank draft or check.
MUNN & CO., 361 Broadway, corner of Franklin Street, New York.

The Scientific American Supplement

is a distinct paper from the SCIENTIFIC AMERICAN. THE SUPPLEMENT is issued weekly. Every number contains 16 octavo pages, uniform in size with SCIENTIFIC AMERICAN. Terms of subscription for SUPPLEMENT, $5.00 a year, for the U. S., Canada or Mexico. $6.00 a year to foreign countries belonging to the Postal Union. Single copies 10 cents. Sold by all newsdealers throughout the country. See prospectus, last page.

Combined Rates.—The SCIENTIFIC AMERICAN and SUPPLEMENT will be sent for one year, to one address in U. S., Canada or Mexico, on receipt of *seven dollars*. To foreign countries within Postal Union *eight dollars and fifty cents a year.*

Building Edition.

THE ARCHITECTS AND BUILDERS EDITION OF THE SCIENTIFIC AMERICAN is a large and splendid illustrated periodical, issued monthly, containing floor plans, perspective views, and sheets of constructive details, pertaining to modern architecture. Each number is illustrated with beautiful plates, showing desirable dwellings, public buildings and architectural work in great variety. To builders and all who contemplate building this work is invaluable. Has the largest circulation of any architectural publication in the world.

Single copies 25 cents. By mail, to any part of the United States, Canada or Mexico, $2.50 a year. To foreign Postal Union countries, $3.00 a year. Combined rate for BUILDING EDITION with SCIENTIFIC AMERICAN, to one address, $5.00 a year. To foreign Postal Union countries, $6.50 a year. Combined rate for BUILDING EDITION, SCIENTIFIC AMERICAN and SUPPLEMENT, $9.00 a year. To foreign Postal Union countries, $11.00 a year.

Spanish Edition of the Scientific American.

LA AMERICA CIENTIFICA E INDUSTRIAL (Spanish trade edition of the SCIENTIFIC AMERICAN) is published monthly, uniform in size and typography with the SCIENTIFIC AMERICAN. Every number of *La America* is profusely illustrated. It is the finest scientific, industrial trade paper printed in the Spanish language. It circulates throughout Cuba, the West Indies, Mexico, Central and South America, Spain and Spanish possessions—wherever the Spanish language is spoken. $3.00 a year, post paid to any part of the world. Single copies 25 cents. See prospectus.

MUNN & CO., Publishers,
361 Broadway, New York.

☞ The safest way to remit is by postal order, express money order, draft or bank check. Make all remittances payable to order of MUNN & CO.

☞ Readers are specially requested to notify the publishers in case of any failure, delay, or irregularity in receipt of papers.

NEW YORK. SATURDAY, DECEMBER 29, 1894.

Contents.

(Illustrated articles are marked with an asterisk.)

Agricultural schools, growth of. 405
Air, compressed, new use of..... 405
Beans, dancing, Mexican 403
Bear, polar, a notable..... 403
Bleaching with sodium silicate.. 407
Boiler tube plug, Harrison's*.... 404
Books and publications, new.... 411
Brush Electric Company, enterprise of the 407
Business aphorisms..... 410
China, great wall of..... 404
Chlorine, liquid 407
Cramp, Wm., & Sons, ship building plant* 401
Electric motors for cotton mills. 407
Engineering insurance company, report 410
Fire alarm, McCaslin's*..... 404
Fire from steam pipes..... 406
Flywheel, a wire..... 410
Heavens in January..... 402
Ice, four-year old..... 410
Inventions recently patented.... 410
Inventors, popular ideas of 404
Invent something..... 407
Iron columns, protection of..... 410
Mortar, brick dust..... 403
Naval progress, a year's..... 406
Notes and queries 411
Palisades of the Hudson, the.... 405
Patents granted, weekly record. 411
Peanut and popcorn plant, steam, portable* 405
Photography orthochromatic... 407
Photo recipes..... 407
Projection, lantern slide, tricolor. 403
Sawmill carriage, Cox's* 404
Signaling, army 403
Slides, lantern, triple-colored... 409
Steam crane, a great*..... 401
Steam engine for small boats (633)..... 411
Ship yard, the Cramps*.....401, 408
Submarine detector, the..... 406
Telephone monopoly, decision against the Bell 402
Telescopes, equatorial stand for small* 406
Thistle, the Russian*..... 406
Torpedo boats, French, useless.. 406

TABLE OF CONTENTS OF

SCIENTIFIC AMERICAN SUPPLEMENT

No. 991.

For the Week Ending December 29, 1894.

Price 10 cents. For sale by all newsdealers

PAGE

I. AERONAUTICS.—Experiments in Aeronautics.—By HIRAM S. MAXIM.—A paper by the great inventor of the flying machine, giving a full account of the present status of his work.—1 illustration..... 15838

II. ASTRONOMY.—History of Encke's Comet.—By W. T. LYNN.—The famous visitor from unknown regions.—What is known of his orbit..... 15833
The Planet Jupiter.—By G. W. HOUGH.—A most interesting article on the greatest of the planets, its features, composition, etc..... 15832

III. BIOGRAPHY.—Anton Rubinstein.—Notes on the life of the great composer, recently deceased, with portrait.—1 illustration.. 15840

IV. BOTANY.—Echinopsis Decaisneana.—A restricted species of interesting cacti.—1 illustration..... 15835
Electricity in Plant Growing.—By L. H. BAILEY.—Continuation of this exhaustive paper on a subject of practical value to the plant grower..... 15885

V. ELECTRICITY.—Distribution of Light from Arc Lamps.—By RANKIN KENNEDY.—A plea for more rational electric lighting, with especial reference to street illumination.—3 illustrations.... 15842
New Sources of Electric Power.—1. Electric Energy Direct from the Coal Fields.—By B. H. THWAITE.—2. Electricity from Peat.—By J. MUNRO.—Possibilities for the future of electric engineering and projects now under way.—The great prospects for the future..... 15840

VI. GEOLOGY.—Silurian Carbon.—By W. R. MACDERMOTT, M.B.T. C.D.—The plant life of the Silurian ages described..... 15834

VII. GEOGRAPHY AND EXPLORATION.—A Trip to Mount Tacoma. By FRED G. PLUMMER.—A recent trip to the great mountain of the Northwest..... 15832
Resources and Commerce of the Argentine Republic.—Notes on the South American Republic.—1 illustration..... 15831

VIII. MISCELLANEOUS.—An Armless Artist.—A curiosity in the art world.—An artist who paints with his mouth.—1 illustration... 15834
The New Stamps..... 15834

IX. NATURAL HISTORY.—The Chameleon.—A Queer Reptile.—By S. L. CLAYES.—A striking family of the saurian race.—Their habits and peculiarities..... 15833

X. PHYSICS.—The Anaglyph.—A development of stereoscopic photographic effects.—A work on photographic optics..... 15837
The Luminescence of Glass.—The phenomena of glass subjected to electric discharge in vacuo..... 15837

XI. RAILROAD ENGINEERING.—Single Rail Railways.—Curiosities of railroad history.—Early work in single line travel.—1 illustration..... 15838
Construction and Operation of Small Street Railways.—By W. WORTH BEAN..... 15838

DECISION AGAINST THE BELL TELEPHONE MONOPOLY.

On December 18 of the present year Judge Carpenter, of the United States Circuit Court, rendered his decision in the suit brought by the Federal government to annul the Berliner microphone patent. The judge on two grounds decides the patent void, and directs it to be delivered up to be canceled. This is a circuit court decision and is open to appeal, and the case, it is to be presumed, will be carried to the higher courts. But the decision is a good one, is very far-reaching, and is the first circuit court defeat which the Bell Company has sustained for many a year.

The suit was brought by the United States through the Attorney-General's office, with Messrs. Causten Browne and Robert S. Taylor as additional counsel. The American Bell Telephone Company was represented by Mr. James J. Storrow and four other counsel. In the title Emil Berliner was joined with the telephone company as a defendant.

The patent in suit is one granted to Emil Berliner on November 17, 1891, and is numbered 463,569. It describes and claims broadly the microphone transmitter of a telephone system. The original date of application was June 4, 1877. For over fourteen years the application was kept alive in the Patent Office by one action after another. Many reasons for delay were assigned, and finally the patent was issued a short time before the two fundamental Bell patents had expired.

For a long series of years the Bell patents had maintained for their owner, the American Bell Telephone Company, an absolute monopoly of the art of transmitting speech electrically, and many millions of dollars of dividends have been earned by this monopoly. The circuit court decisions had been so many and so strong in the patent's favor that any attack on it was hopeless. As the dates approached when the Bell patents were to lapse, a new patent was issued to Berliner, which if sustained would have practically extended the monopoly to 1908. It is a definite fact that the microphone is all that has made telephony a commercial success. The Berliner patent covered in its claims this device most completely.

A quantity of testimony was taken on both sides, and the case was pressed to a final hearing. There were three grounds of action practically, as embodied in the government's case One was the issue of a patent in 1880 to Berliner for the same invention; another was the extraordinary delay in the granting of the patent. On both these grounds the judge decided in the government's favor and against the Bell Company. The other ground was the changes in the text, drawings and claims of the application while it was pending in the office. Of this the court takes no notice in the decision.

The 1880 Berliner patent just alluded to, while apparently intended to be for a microphone used in the role of receiver, something for which it is not well adapted, contained a claim for two microphones in circuit with each other, one as transmitter and the other as receiver. This enabled the court to find in it the transmitter of the patent in suit, and hence to decide the patent in suit to be void, as two patents cannot be awarded for the same invention.

The delay in the issuing of the patent receives by far the most consideration in the decision. This was undoubtedly the main point in the case. The court finds that the microphone covered by the Berliner patent had been in use since 1878 by the Bell Company. From 1877, when the application was filed, to 1882, the application for the patent in suit had been regularly prosecuted, and the court finds no fault with the transactions of these five years. About this time the delays which have vitiated the patent began. The case was withheld from issue to await the declaration of interferences. One of the Bell telephone cases, the Drawbaugh suit, came before the Supreme Court. This was made a ground by the Patent Office for more delay, in order to have the decision of the court to guide its actions. This decision was given in 1888. Still a prospective interference with the same party was awaiting a public use proceeding in the office. Drawbaugh was thrown out on this, so that finally in 1891 the Commissioner decided that the patent should be issued. The threatened Drawbaugh interference had kept the patent from issue for years. Ordinarily a patentee feels aggrieved at delay, but here was a case where delay was of the utmost value, provided the patent could be obtained and upheld. The Patent Office took upon itself judicial and quasi-paternal functions; acted as if a patent were more than prima facie evidence of originality, and in committing a wrong, fortunately established a precedent for greater promptitude in the future.

There is one most excellent assertion in the decision, where the judge speaks of the Commissioner ascertaining "prima facie and with sufficient certainty for the purpose of an administrative decision, by which the first invention of the microphone had been made." The true functions of the Commissioner of Patents have never been better outlined. A prima facie case for administrative action is all that is needed to justify the issue of a patent and the Commissioner is not to be a self-constituted judge.

We have repeatedly advocated in these columns the propriety and the importance of the liberal treatment of inventors by the Patent Office. The true function of the office should be the granting of patents, not the endeavoring to adjudicate as to the merits of an invention.

Were the system changed so that patents would be granted on application without all the examination for priority, originality, and even utility, that is now given the inventions claimed in the applications, the interests of the public would be conserved. There would be less desire for useless patents than now, when the squeezing of a patent through the Patent Office gives it, in the eyes of its owner at least, a sort of judicial force. The best attorneys would be required in the system, as the search for originality would be done outside of the Patent Office, and inventors would be careful not to waste their money on useless letters patent.

THE HEAVENS IN JANUARY.

There is something besides the planets and the constellations to interest star gazers during the coming month. In truth our good ship, the earth, as she cleaves the ethereal ocean is continually bringing into view some new sight for those who keep a sharp watch to larboard and to starboard. The astronomical outlooks, on November 1, spied a comet coming sunward. With that keen sense of recognition which enables a seaman to name an approaching vessel before its hull has fairly risen, they at once pronounced the stranger to be Encke's comet. It is in the constellation Pegasus, and on January 1 it will be three or four degrees southwest of the star Theta in that constellation, and will set a little before 10 o'clock in the evening. By the middle of the month it will have passed into Aquarius and will be near the star Alpha Aquarii, and at the end of the month it will be close to the northern border of Capricornus, and will set before 6 P. M. It will be in perihelion on February 4. Encke's comet is rarely bright enough to be seen with the naked eye, and the interest it excites is due principally to the evidence it gives of encountering some resistance in space. Its period is a little less than three years and four months, but this period has been gradually shortening ever since the comet's discovery in 1818. Until 1868 it lost about two hours and a half on each circuit, but since then the rate of shortening has been reduced one-half. What causes the shortening of the period, and more particularly what caused the change in 1868, is more or less a mystery. A resistance to the comet's motion would accelerate its return to perihelion by sending it closer to the sun, and thus compelling it to quicken its pace; but the exact nature of the resistance remains to be discovered.

Mars and Jupiter continue to attract universal attention. Mars has just crossed the line from Pisces into Aries and is on the meridian, at the beginning of the month, at 7 P. M. At the end of the month the planet, which is moving eastward, will be near the star Pi Arietis, and will pass the meridian about 6 P. M.

Jupiter is in Gemini, immersed in the Milky Way, near the stars Mu and Eta, and the magnificent cluster M 35. It is a glorious neighborhood. He is moving slowly, one might say majestically, westward, as if to meet Mars and complete the subjugation of the already humbled planet of war. About the end of the month he will cross over into Taurus. On the 1st he passes the meridian about 11 P. M., and at the end of the month about 9 P. M. His wonderful disk has never appeared more splendid in the telescope than it does this winter. Whoever wishes to see a giant world in an early stage of its evolution should look at Jupiter. Here is answer for Keats' banished god crying,

"Where is another chaos? Where?"

As last month, I give again a few dates, in Eastern standard time, on which the interesting phenomena of the transits of Jupiter's moons and their shadows may be witnessed with the aid of a three or four inch telescope.

On January 3, satellite III will enter on Jupiter's disk at 8:55 P. M., its shadow will follow at 10:10 P. M. About 11:30 P. M., the shadow will be near the central meridian of the planet. At about 9:38 P. M., satellite I will reappear from eclipse on the eastern side of Jupiter.

On January 16, satellite II will enter on the disk at 7:37 P. M.; the shadow will follow at 8:50 P. M., and the latter will be near the central meridian about 9:40 P. M.

On January 25, satellite II will reappear from eclipse on the eastern side of Jupiter at 8:58 P. M. At 9:38 P. M. satellite I will enter on the disk. The shadow will follow at 10:26 P. M., and will reach the central meridian about 11:30 P. M.

The satellites cross the disk from east to west. Satellite I and its shadow pass near or upon the great south belt; the others pass farther to the south.

Neptune is in Taurus, near the star Iota. Only a very powerful telescope can show Neptune's satellite, and the most powerful fails to reveal any distinctive

features on the planet's dusky green disk. It is not visible at all to the naked eye.

Mercury is out of sight on the other side of the sun.

Venus is evening star, but too near the sun to be well seen this month.

Saturn is in Virgo, close to the boundary of Libra and a little east of the star Kappa. It rises at 2 A. M. at the opening of the month and at midnight at the close.

Uranus is in Libra, above the star Iota, rising about 3:30 A. M. at the beginning and about 1:30 A. M. at the end of the month.

January opens with a crescent moon. The moon attains first quarter in Pisces at 2:52 A. M. on the 4th; fulls in Cancer at 1:50 A. M. on the 11th, and reaches last quarter in Virgo at 5:55 P. M. on the 17th. She is in perigee or nearest to the earth at 7:14 P. M on the 11th. It will be observed that the time of the moon's nearest approach to the earth this month differs by only a few hours from the time of full moon. The result must be higher tides than usual about the 11th, and those who believe in the theory that earthquakes are more likely to occur when the tidal strain upon the earth is greatest might expect, about that date, a confirmation of their opinion.

The moon will be in conjunction with Mars on the afternoon of the 5th, with Neptune on the afternoon of the 8th, with Jupiter on the afternoon of the 9th, with Saturn on the afternoon of the 18th, and with Uranus at midday on the 19th.

Among the fixed stars this month, Sirius, the Dog Star, easily takes precedence, as he always does when in the field with his rivals. Observe the incessant activity of his rays, and disentangle, if you can, the diamond flash of prismatic colors shot out of the interior whiteness. The greatest compliment a poet ever paid to an epic hero was that of Homer to Achilles in likening him to Sirius when he chased Hector to the Scean gate:

"Him the old man Priam first beheld as he sped across the plain blazing as the star whose name men call Orion's dog. Even so, on Achilles' breast the bronze gleamed as he ran."

The celebrated companion of Sirius was last seen by Mr. Burnham with the great Lick telescope, in 1890. But if Burnham's calculation of the orbit in which the companion travels is correct, the little star should emerge from the effulgence of its master orb during the present year and become visible again with a few of the largest telescopes.

Among double stars favorably situated for observation during the evenings of January may be mentioned Castor in Gemini. The two stars composing it are of the second and third magnitude respectively, and are nearly 6″ apart, so that a 3 inch telescope separates them beautifully.

Those who have more powerful telescopes—a 5 inch aperture, for instance—may look at the fine triple star Zeta in Cancer. The two nearest components are only 1″ apart, while the distance of the third star is more than 5″.

It is very interesting for us, whose god of day is single and independent, to behold some of those coupled suns.

GARRETT P. SERVISS.

Tricolor Lantern Slide Projection.

Nearly a year ago we described and illustrated Mr. R. D. Gray's triple lantern for the projection of triple lantern slides in the colors of nature, and alluded to his success in getting the three images superposed over each other on the screen in exact register and to the marvelous blending of the three colors—red, blue, and yellow—so perfectly as to bring out in comparative harmony all of the varying shades and grades of color, of the different objects of the view. At the annual stereopticon exhibition held in the office of the SCIENTIFIC AMERICAN for the entertainment of its numerous employes and friends, on the 20th instant, Mr. Gray exhibited his improved apparatus and projected fifty or more of his beautiful colored pictures of Irish and Switzerland scenery taken by him on a special trip for the purpose during the past summer. One noticeable characteristic of his mountain scenery, especially in one or two views of the Jungfrau, was the delicate azure blue of the sky, against which, clouded slightly in front by an atmospheric mist, appeared the grand snowy peaks of the mountain; there were other views of Mont Blanc and Chamounix Valley, the Mer de Glace, the glaciers forming the source of the Rhone, the cataract of the Rhone falling from the foot of a glacier; examples of portraiture, showing the color of the hair and skin perfectly; flowers, gladiolas, and a combination of various kinds of fruit, that were wonderfully realistic and delicate in color.

Mr. Gray has special methods of modifying the colors during the time the picture is on the screen, and produces tints which are quite true to nature. His control of the blue in the skies, making them much more natural than one would expect, greatly enhanced the beauty of the landscapes. Mr. Gray is giving a series of exhibitions in this city of his colored views. The next one, we understand, occurs on the evening of December 30, at Hardman Hall. He has worked industriously to develop and perfect the tricolor method of taking and reproducing photographs in colors, and merits the success he has attained.

Army Signaling.

A recent number of the Electrical Engineer contains an interesting article, by George Heli Guy, descriptive of the methods of signaling in the U. S. army, as practiced at Fort Riley, Kansas, from which we make the following abstracts:

The means of communication by day used by the Signal Corps are flags, heliograph, and the field telegraph and telephone trains; and by night, the torch, flash lantern, rockets, bombs, and search light. The method of visual signaling by flags consists in waving a flag to the right for a dot, to the left for a dash, and to the front for the space in the American Morse code. The heliograph, in brief, consists of a combination of mirrors by which a beam of sunlight is thrown in the required direction, and the dots and dashes of the Morse code are made by the opening and closing of a shutter placed in the track of the beam of sunlight. The heliograph has been used recently by the corps up to a distance of 182 miles. At night the Morse code is sent either by the waving of a torch or flashes of light from the flash lantern, the illuminant being coal oil.

The telegraph cable cart can be run either by hand or by a horse. It will carry four miles of double cable. A field kit is attached by a flexible wire to the cart, and communication is always possible, whether the cart is at rest or in motion. The field telephone kit carried by the operator is a leather box, 9½ inches long, 8 inches high, and 4½ inches wide. It weighs about 10 pounds, and contains a Morse key on a buzzer circuit, a Berthon-Ader combined transmitter and receiver, and two cells of dry battery. The Morse key is used as a call for the telephone, and—in case the telephone breaks down—to send messages on the buzzer. The receiver and transmitter are in one piece. The box is carried slung over the shoulder, and does not in any way impede the progress of the operator.

The method of erecting the telegraph line is briefly as follows: At the head of the line the battery wagon is stationed; then a "surveyor" marks the general direction of the line. He is followed by "markers" and "pin men," the markers pacing off the distance of about 55 yards and the pin men placing pins, similar to surveyors' "pins," in the ground to mark the location of the poles. These are followed by "crow bar men," who dig holes for the reception of the lances from 18 to 24 inches deep, according to the character of the ground. A lance is delivered from the lance truck, the wire men put the wire, which has been laid on the ground from the wire wagon, on the insulators, insert the lances in the holes, haul taut on the line, and tie the wire about every fourth or fifth lance with a tie insulator. When the line reaches the desired point, instruments are joined on, and communication made with the battery wagon, which has an instrument on the line at all times. In favorable country the train should average at least two miles an hour.

The balloon train at Fort Riley consists of three wagons for the carriage of tubes of compressed hydrogen and one wagon for the balloon and appliances for handling it. The tubes are of compressed steel, one cubic foot in capacity, and contain hydrogen at a pressure of 200 atmospheres. These tubes are charged at the compressing plant, which is located at Fort Logan, near Denver, Colorado. The gas is generated and the tubes filled there and shipped to the point of ascension. The balloon wagon itself has a compartment for storing the balloon, basket, and netting, and at the rear has a large drum with gearing and brake. The drum carries 2,500 feet of steel cable, which has in its core two insulated conductors for use on the telephone circuit. The wagon is of such weight as to hold the balloon when inflated by its own weight, and after the balloon has once ascended it may be moved over the ground by simply moving the wagon. The balloon itself is of gold beater's skin, of about 13,000 cubic feet capacity, and, when distended, is of spherical shape, with a slight elongation at the neck. The car or basket is of willow wickerwork, light but strong, and sufficiently large to carry two observers, with the necessary amount of ballast and equipment.

The balloon is filled by attaching a linen hose to its neck, inserting the tops of the gas cylinders in the hose, and opening the valves of the cylinders. It takes about 108 cylinders at 120 atmospheres pressure to fill the balloon, and after its inflation the gas is retained for a long period. If there should be an escape of gas overnight, the deficiency is made up from one of the tubes. When the balloon is inflated the maneuvering bar is attached to the end of the cable on the drum of the balloon wagon, and the necessary amount of cable is paid out. The height of the balloon above the ground is, of course regulated by the length of cable paid out, and the observer in the car, having a field kit telephone, can direct the manipulation of the balloon itself as occasion may require.

The equipment of the car consists of an aneroid barometer, prismatic compass, telescope, field glasses, notebook and pencil, telephone, maps of the country, and a camera. The operator is thus fully prepared for photographic work and observation. It may be thought that a balloon would present a good target to the enemy; but the experiments at Shoeburyness with an old captive balloon showed that it is almost impossible to hit such an object with longe range musketry fire, or by artillery fire, especially if it be kept moving, which it always would be. It was also shown by these experiments that the balloon, when filled full of holes by a shrapnel, settled gradually and gently to the earth. When struck it was about 2,000 feet high, and it took 27 minutes to descend to the ground.

Mr. Ives' Triple-Colored Lantern Slides.

Before the Society of Amateur Photographers in this city a few days ago Mr. Frederick E. Ives, of Philadelphia, exhibited his new triple-colored lantern slide on the screen. He makes three bichromated gelatine prints from the three negatives, representing respectively the color values in monochrome of red, blue, and yellow. The positive gelatine print from the red negative is dipped or stained with a light red dye, the others with blue and yellow, then they are superposed in exact register over each other and clamped between cover glasses and bound, forming a tricolor lantern slide. It can then be put in the lantern like any other slide and projected in the colors of nature, provided the respective colors of the stained films are of the proper proportionate value. Specimen slides shown, particularly of landscapes, had the sky too blue, apparently, and were slightly blurred, no doubt, in part, due to a slight refraction of electric light in passing through so many films. He exhibited several flower and fruit pictures, however, that appeared very natural. Commercially it would be expensive to make such slides. He has improved his photochromoscope by making it stereoscopic, thereby necessitating the making of six photographs at one time and providing six duplicate monochrome transparencies. By improved and simplified construction he has succeeded in doing this very perfectly. We have viewed through this apparatus a box of Huyler's candies, fruit and flower pictures, which appeared so accurately that one could imagine they were solid enough to be picked up or plucked.

Brick Dust Mortar.

The use of brick dust mortar as a substitute for hydraulic cement, where the latter cannot be obtained, is now recommended, the Southern Architect says, on the best engineering authority, experiments made with mixtures of brick dust and quicklime showing that blocks of one-half inch in thickness, after immersion in water for four months, bore without crushing, crumbling, or splitting, a pressure of 1,500 pounds per square inch. It is considered, too, that the addition of even as small a proportion as one-tenth as much brick dust as sand to ordinary mortars is preventive of the disintegration so often characterizing mortars used in the masonry of public works. The use of brick dust mixed with lime and sand is said to be generally and successfully practiced in the Spanish dominions, and is stated to be in all respects superior to the best Rosendale hydraulic cement in the construction of culverts, drains, tanks, or cisterns, and even roofs, whether for setting flat tiles or for making the usual tropical flat roof. The proportions used there in the manufacture are, approximately, one of brick dust, one of lime and two of sand, mixed together dry and tempered with water in the usual way.

A Notable Polar Bear.

The large polor bear which for 23 years had lived in the menagerie of the Zoological Society, London, died recently after a fortnight's illness. The bear was presented to the society by Mr. B. L. Smith, who brought it home from an Arctic voyage in 1871. Frank Buckland then described it as "about the size of a Newfoundland dog, but more short and stumpy, with a splendid shaggy coat of long, yellow hair." In its long life at the gardens, under the same careful management by which another specimen of the same species was kept for 36 years in the menagerie, it grew to a size rarely equaled, even by the largest polar bears killed in the Arctic regions, and its weight was estimated at three-quarters of a ton, though during its illness it refused food and became much emaciated.

Mexican Dancing Beans.

The familiar "dancing beans" which have been displayed of late in the shop windows have become a very popular novelty, and great quantities of them have been sold throughout the country at ridiculously high prices. The bean is the seed of the Sebastiana palmeri, a shrub which grows abundantly in Alamas, Sonora, and other parts of Mexico. The curious movement or "dancing" is caused by the antics of a larva, the Carpocapsa saltitans, which is imprisoned in the hollow shell of the bean. The larva resembles closely the common apple worm of our orchards. The bean has no particular intrinsic value.