A PAGODA INCLOSED BY A BANYAN TREE.

We are indebted to Mr. Wm. Whitley, of Myanaung, India, for a photograph, cut of which we here reproduce, showing the curious manner in which a banyan tree has grown up around and completely inclosed and embraced a pagoda. The building is of masonry, which must have been very strong to enable it to withstand the strains put on it during storms, which our correspondent states are sometimes very heavy. The photograph was taken by Mr. Francis, of the above place.

Cold Phosphorescence.

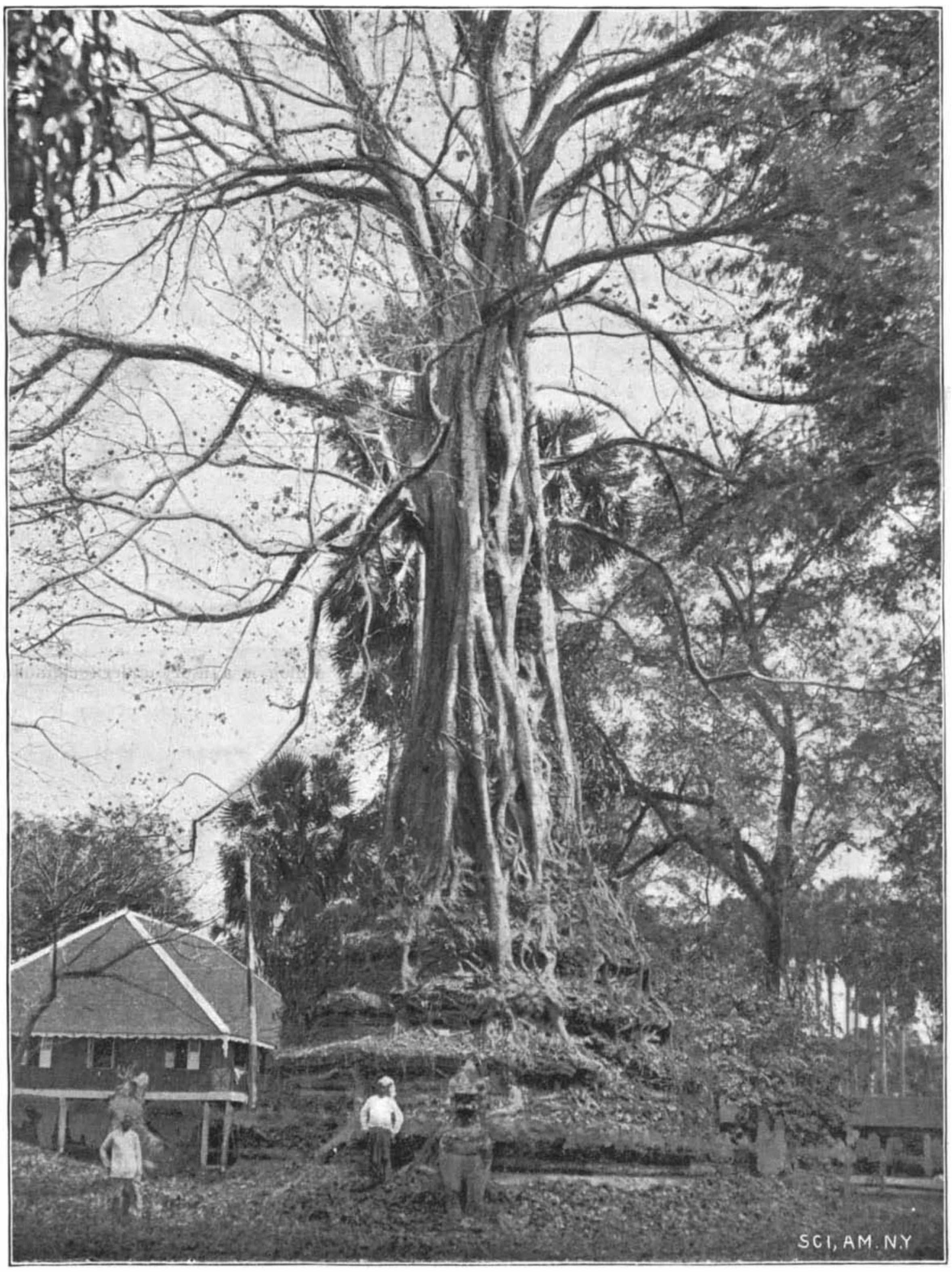
An interesting lecture on phosphorescence was lately delivered by Professor Dewar at the Royal Institution, which he delivered before the Chemical Society early in the year, and to some extent repeated the brilliant experiments in phosphorescence—the phrase is applicable whether used in the material or philosophic sense—with which that lecture was accompanied. There was this difference, however, in the constitution of the address, that whereas the lecture delivered before the Chemical Society had for its end a chemical classification of bodies according to the degree of phosphorescence they exhibited at minus temperatures, the demonstration recently rather aimed at giving something of the general history of our knowledge of phosphorescence. Professor Dewar began with definitions. We may imitate him—at some distance—perhaps ourselves. If we take a piece of phosphorus which has been exposed to the light, into a dark room, we find it giving out light; if we treat in like manner a piece of paraffin wax, we find the phenomenon repeated, though in a much slighter degree. The researches of Becquerel showed that this power of giving out absorbed light, this phosphorescence, depended directly on the intensity of the stimulating light, and also on—to be intelligible, if deeply unscientific—an action among the body's molecules, when stimulated by heat or cold. For instance, there are certain sulphides of calcium whose power of phosphorescence increases as they are heated. The action of cooling to the enormous minus temperatures which Professor Dewar obtains with liquid air and liquid oxygen is similar. As a general rule, it may be stated that the great majority of substances exhibiting feeble phosphorescence at ordinary temperature become highly phosphorescent at these very low temperatures. The paraffin wax candle glows like an electric vacuum tube after it has been dipped in boiling liquid air. And what this act of cooking appears to effect is this—it so agitates the molecules of the body that the reflected rays of absorbed light, nearly invisible under ordinary conditions, become patently visible under the action of this stimulation.

What are known as the ultra-violet rays of the spectrum become visible, for there is this characteristic of phosphorescence to be noted, that in all cases the luminous effects belong to a less refrangible part of the spectrum than the exciting rays.

Gelatine, celluloid, paraffin, ivory, horn and India rubber become distinctly luminous, with a bluish or greenish phosphorescence, after cooling to —180°, and being stimulated by the electric light. An egg dipped into a beam of electric light and then, having cooled it to —180°, shows the spectators that it glows like Protean fire.

It was very interesting to see that, although when water is pure it is only feebly phosphorescent, yet that it is remarkably luminous when impure. Feathers dipped in the boiling liquid air shone clearly outlined in the darkened room with a delicate green light, and lastly the professor took a stephanotis and cooled it to the temperature at which every living thing must die. But the flower, as if protected by a fairy godmother, only steeled itself to the ordeal, becoming, indeed, as brittle as the finest glass, and when it was lifted from out the liquid, glowed magically with a pale blue light.

The concluding part of the lecture dealt with the effect of the minus temperatures on photographic films. At —180° phosphorus will not burn; chemical action ceases. Therefore, when Professor Dewar first applied his temperatures to photographic action, he had, he said, been puzzled to find that the action, though considerably diminished, still went on. The impression on a chilled photographic film was less by about 80 per cent than that left on a film at ordinary temperatures, but still there the impression was. How was it? "I stumbled on it," said Professor Dewar. "It was phosphorescence. I was actually stimulating the plate by cooling it." The fact is that, like so many other bodies, a photographic film, when cooled to —180°, becomes more capable of absorbing and reproducing light impressed upon it, and acts, so to speak, by its own phosphorescence.



A PAGODA INCLOSED BY A BANYAN TREE.

A Novel Application of Bichromated Gelatin.

Izarn, the author, recommends coating silvered surfaces in general, and the mirrors of astronomical telescopes in particular, with an extremely thin film of bichromated gelatin in order to protect them from atmospheric tarnish. Such films are stated to be very adhesive, durable and transparent; and it was found by experiment that surfaces thus protected remained perfectly bright, even after prolonged contact with sulphureted hydrogen. The process has been applied to the mirror of a telescope at the Toulouse observatory with very satisfactory results, the sharpness of definition, etc., of the instrument being in no way deteriorated.

The Sutro Baths.

The Sutro baths exceed the famous Roman baths of antiquity, in size as well as equipment. The largest of the Roman baths had about two hundred feet of frontage, to use the modern commercial terms of designation. Two of these great bathing places might be dropped within the Sutro baths and still leave room enough for men to walk and women to flirt. Adolph Sutro is a skillful engineer, and he enjoys solving problems in construction or breaking through difficulties in mechanics as he enjoys invigorating exercise. He designed the building over the bath, devised the plan for water supply, invented and patented the apparatus for heating the water.

The Sutro tunnels, second series, are part of his scheme of construction. With the ocean at his feet, the breakers dashing against the rocks, Mr. Sutro deemed that nature had so well provided power to send the water to the bathing tanks that artificial means would be unnecessary. Therefore, with much noise and enthusiasm, he blasted out a basin in the solid rock. Over the edge of this basin comes the water of the huge rollers. Instead of riding the crest of the wave, Mr. Sutro traps the crest of the wave and uses it for his own purpose. From the basin the water flows through tunnels and canals, passes gates until it reaches the reservoir, where it is warmed by the Sutro patent process, and then it flows into the great tanks in the huge glass and steel building. On the road to the tanks through the canals and the tunnels the water has to pay toll of sand. Of course it would not do to have the waves carry their load of sand into the baths, so a settling place is provided. By automatic arrangement, also the device of Mr. Sutro, the sand is washed back into the ocean, while the water, cleared, goes on its course through the tunnels and canals to the tanks.

Sometimes the tide is very low, and sometimes the ocean, even at the cliff, is quiet. There might be times when the water could not dash over the rocky wall into the basin. Artifice is employed to take the place of nature when nature is in a quiet mood. An emergency pipe pokes its black proboscis under the waves, and a pump can draw through it 5,000 gallons a minute, whenever the 5,000 gallons are wanted in a minute. Having made enough tunnels to admit the water, sandless and tepid, to the tanks, Mr. Sutro had to provide for sending the water to sea again, that the ocean might not be drained. Dropping out the water at the place at which it was taken in would not be satisfactory. Mr. Sutro did not want the baths to be receiving the same water over and over again. That plan would be too easy. In it were no obstacles to overcome. He laid an outlet pipe through tunnels probably several hundred feet long, and through this the water will flow from the tanks and return to the sea several hundred feet from the place whence it was taken. The water that comes in through the tunnels must fill six tanks. The largest of these, the main swimming tank, is 275 feet long, and at the place of greatest breadth is 150 feet wide. The other tanks are smaller. Some will be used for ladies and children, some for beginners; each one has its particular use. One tank will be filled with cold salt water for swimmers who want a shock. Then there is a little tank filled with fresh water, supplied from the Sutro water works on the bluff above.—San Francisco Examiner.

THE velocity of light may be taken as about 186,300 miles a second.

Ship Canals Projected and in Progress.

The Suez Canal cost $115,000,000 and is capitalized at $90,500,000. In 1892 it paid a net profit of $8,333,333⅓, which was produced by the passage of 3,559 vessels through the canal. Shares, the par value of which is $100, are quoted on the Paris Bourse at $538.50. The $20,000,000 worth of stock held by the British government is quoted at $95,000,000 in the open market.

The Nicaragua Canal, even if a commercial failure, would be of great advantage to the United States, as the controlling ownership of this waterway between the oceans would be worth the $70,000,000 to which government credit is expressly limited in the bill now pending before Congress. The fate of the Panama Canal is still in doubt. In the United States several canal projects are under discussion. The plans for a ship canal between Delaware and Chesapeake Bays, and from the Hudson to the Great Lakes, have already been noticed in the SCIENTIFIC AMERICAN for July 21 and September 29, 1894. Two additional schemes are now under discussion. First, the ship canal between the Delaware River and Raritan Bay, an important link in the chain of interior waterways, which will ultimately, it is hoped, enable vessels of large size to pass from Boston to the Gulf of Mexico without being exposed to the fire of a hostile fleet. The second ship canal, known as the Florida Ship Canal, which is intended to pierce the isthmus that connects the peninsula with the mainland, is being warmly advocated by the Southern press. This canal would only be one hundred and fifty miles long and would lessen the distance between New Orleans and Liverpool by 1,000 miles and would tend to greatly increase the commerce of the Southern ports. It would be of great value in the development of the Southern and Western coal fields.

Europe has had three ship canals opened for traffic in the last eighteen months, the Manchester, the Corinth and the Baltic and North Sea Canals, and several others are now under discussion. The most important of these canals are the Manchester and the Baltic and North Sea Canals. We illustrated the locks of the latter canal in the SCIENTIFIC AMERICAN of December 1, 1894. It is 61 miles long, 200 feet wide at the surface, 85 feet at the bottom and the depth is 28 feet. The canal will be crossed by four railway lines and six highroads. The canal starts at Holtenau, on Kiel Bay, and joins the Elbe 15 miles above its mouth. The estimated cost is $39,000,000. The Elbe-Trave Canal will probably be built for use in connection with the Baltic and North Sea Canal; the estimated cost is $5,340,000. Prussia has contributed $1,875,000 toward it. As nearly seven-eighths of the proposed canal is in Prussian territory, the community is naturally interested in preventing Hamburg from monopolizing the trade of the country.

A scheme is now under discussion to enlarge the canal and port of Brussels, so as to make it accessible to vessels of 2,000 tons. The government has promised 10,000,000 francs and the city 7,000,000 francs. The estimated cost of the canal is only about $3,700,000. The Merwede Canal, between Amsterdam and the Rhine, can hardly rank as a ship canal, as the depth is only 10¼ feet. One portion of it was completed August 4, 1892.

For a number of years past the subject of the canalization of the Seine has been agitated in France. Rouen is a port for sea-going vessels, but there seems to be great opposition toward any attempt to make Paris one also. The plan of M. Bouquet de la Grye for securing a draught of 24·4 feet from Havre to Paris is now under discussion. By the improvements which have already been made in the river it has been possible for a gunboat to reach Paris, and a short time ago a three-masted sea-going bark, 203 feet long, was launched at St. Denis, just below Paris. The depth of the hold of this vessel was 22 feet and the beam was 35 feet.

A decree published in the Journal Officiel for September 22, 1894, provided for a commission of inquiry to look into the plans, which had been placed on exhibition at Paris in June, for the Bay of Biscay and Mediterranean Ship Canal. The length of the canal, which will extend from Bordeaux to Narbonne, varies in the different plans from 220 to 320 miles, the cost of which would be from $200,000,000 to $300,000,000. Such a canal would be of great service both in times of peace and war, but the expense is a serious drawback to the success of the enterprise, as the amount received for tolls would probably not be sufficient to pay the interest on the debt. Italy has recently had two ship canal projects, neither of which is likely to materialize in the near future. They are, however, very interesting from an engineering point of view, owing to the reclamation of large tracts of land which are useless at present. The first scheme is a waterway deep enough for the largest war vessels to pass from the Mediterranean Sea to the Adriatic. The canal, which would be 125 miles long, would proceed from Montalto di Castro to the east coast at Fano. It would drain large boggy districts as well as the lakes of Thrasymene, Bolseno, and Montepulciano. The cost would be about $120,000,000. The second project is more feasible. It is to make a canal 24 miles long at Reggio, connecting with the Amato and Carace Rivers, thus piercing the peninsula and enabling vessels to pass through without sailing around Sicily or going through the straits of Messina. The promoters expect that the land which would be rendered fit for cultivation would pay the cost.

In Great Britain two canals have been discussed, and there is every prospect that one of them, the Forth and Clyde Ship Canal, will be constructed; the other, the Wakefield Ship Canal, in Yorkshire, England, is of purely local interest. The estimated cost of the Forth and Clyde Canal is from $35,000,000 to $40,000,000, depending on the route adopted. The route has not been definitely decided on as yet. Three thousand vessels used the Manchester Ship Canal in the first year after its opening.

DECISIONS RELATING TO PATENTS.

U. S. Circuit Court—Southern District of New York.

TRAVERS *v.* AMERICAN CORDAGE COMPANY.

Patents No. 277,161, issued May 8, 1883, and No. 296,460, issued April 8, 1884, to Albert O. Rood, for improvements in the art of making hammocks, examined and held to be valid.

Coxe, J.

The earlier patent, No. 277,161, relates to a new process of making the bodies of hammocks. Prior to the invention this had been done by weaving the thread in both directions between the supporting frames. The operator, provided with a shuttle on which the thread was wound, began at one end of the selvedge and interlooped the thread with the thread attached to the selvedge until she reached the opposite end of the frame, when she repeated the same interlacing process back again, and so on from one end of the frame to the other until the hammock body was completed. This operation took considerable time. It is estimated that an hour and twenty minutes was consumed in weaving one hammock body. The inventor reduced the operator's manipulation about fifty per cent by laying a strand straight across from frame to frame and weaving that strand into the hammock body. Instead of weaving each time she crosses from frame to frame, as in the old method, the operator now weaves every other time only. The work of the shuttle is thus reduced from two trips to one. That this saves time is manifest. Precisely how much time is saved is not established. The test made by the complainant's expert is not a demonstration. If he be right in his estimates, the invention increases the production threefold.

Rood, being the first in this particular branch of industry, is entitled to a liberal construction—a construction which will enable him to hold the fruits of his invention. So to construe the claim that an infringer is able to take the only valuable feature of the invention is to do injustice to the inventor.

It appears that almost from its inception the inventor was endeavoring to improve his process: that improvements were made in 1884, and again in 1889, when the improved method was adopted which is now practiced by both complainant and defendant. It is not necessary to describe this method. The changes do not go to the essence of the invention. It is a more convenient way of practicing it and produces a hammock body having a more symmetrical appearance; but the essence of the invention is in this method precisely as in the method described in the patent. The defendant, having appropriated this method, is not exculpated because it has used it in connection with improvements subsequently adopted by the inventor.

Patent No. 296,460 relates to a new method of making the ends of hammocks—attaching the converging stands to the completed hammock body. Previous to the invention this had been done by winding the end cord around a shuttle and carrying the cord by means of the shuttle through a loop of the hammock body, thence around a pin fixed at the desired distance from the hammock body, back again through another loop, and so on back and forth through a loop and around the pin until all the loops had thus been taken up. The patentee dispenses with this tiresome and expensive process. He draws the end of a cord, which he takes from a large reel, through all the end loops of the hammock body, and from thence to a fixed pin, to which the cord is tied. He then draws the cord from between the loops and lays it over two fixed pins, and so on until the cord has been so drawn from between each of the loops, the reel permitting the cord to run easily through the loops. When all the loops have been thus connected, the cord is cut, the other end is released from the pin, the two ends are united, and the strands between the pins are wound and formed into an end loop ready for use.

There is evidence that this method is simpler and more rapid than the old one; that by it an inexperienced operator can make four or five times as many hammocks as an experienced operator can make by the old method. It saves time and money. Nothing like it was ever done before.

The defenses are lack of invention and anticipation. Infringement is not denied.

The contention that the patent is anticipated is based upon the alleged prior use of Louis Hinze.

It is unnecessary to discuss this testimony. Suffice it to say that the only proposition which it establishes beyond a reasonable doubt is that it is absolutely untrustworthy. It is so full of contradictions, inaccuracies, and tergiversations, so permeated with venality, so honeycombed with falsehood—to use no harsher term—that the court cannot for a moment think of basing any finding thereon injurious to the patent. This defense has been so often and so lately considered by this court that it is unnecessary to dwell upon the rules which require the court to disregard it now.

Does this patent disclose invention?

The process is a simple but ingenious one which would not have occurred to the skilled hammock maker, even if he had before him all the nets, glove-fasteners, ships' tackle, bed bottoms, and lawyers' bags out of the prior art. He would have continued to use the old shuttle in the old way. True, the patentee "struck" the process at once; but nothing unfavorable to him can be predicated of this fact. Indeed, the contrary is true. Many of the great inventions have come like a flash. The conception has been instantaneous, although the embodiment may have taken more or less time, according to the character of the invention. Such ideas, involving an entire change of methods, whether they come quickly or slowly, always come to inventors. They never come to mere mechanics. The invention is not a great one; but it would be a step backward for the court to hold that the ingenious process, which has done so much to advance the art of hammock making, only involves mechanical skill.

It follows that the complainant is entitled to the usual decree.

Coloring Photos.

Opaque colors may be applied to the background and drapery, but it is not wise policy to do so to the face, for fear of losing the likeness. Of course, an experienced painter may do what he chooses, using either opaque or transparent oils, but in these notes we are assuming the photographer to have only limited experience. The object of applying t' e coating of size will be evident. But for it, the oil would penetrate the paper and cause a stain.

When examining some matt Solio prints, it occurred to us that a surface of this nature would prove unusually excellent for the application of powder colors. Perhaps some of our readers may not be aware that colors of this class were used at one time in the coloring of daguerreotypes and collodion positives. They are said to have been prepared by the admixture of a little gum arabic in solution with the various pigments preferred for the purpose, and, after drying, pulverizing them to an impalpable powder and transferring them to small bottles. This, at any rate, was the way we prepared them when any special color was required not easy to be readily obtained, for in these days hinted at the preparation of powder color was in the hands of but few. Happily they can now be readily procured. A little of this on the point of a camel's hair pencil was applied to the daguerreotype with a swirling motion, and was fixed by breathing upon it. Beautiful effects were thus capable of being obtained.

We find that powdered colors, when applied to matt gelatine prints, form a ready means for imparting a seemingly elaborate coloring to a print, their application being made in a surprisingly brief period of time. When the superfluous powder has been dusted off, it would puzzle all but the initiated to tell by what means the color has been applied. If executed with judgment, the photograph has an appearance as if it had been carefully worked over by a skillful miniature painter, and, owing to the texture of the surface, the colors adhere with great tenacity. This is a method of tinting a print which we can very strongly recommend.—British Journal.

The Value of the Scientific American.

An esteemed subscriber, in renewing his subscription this year, writes as follows:

In your issue of January 20, 1894, you saw fit to quote me under the head of "The Value of the SCIENTIFIC AMERICAN." Let me give you a better authority. When one of the sons there mentioned was a freshman of A. A. University, mathematics came very hard to him, and along at first he was frequently "conditioned." He and I went to see President Angel, who replied: "The professor is easy on a boy that he thinks is doing his best; but very rough on one that he thinks is 'ponying.' I will see him about it. By the way, what papers have you been reading?" The boy replied, "Detroit Daily Tribune, Harper's Monthly Magazine, Phrenological Journal, and the SCIENTIFIC AMERICAN." President Angel replied, "I will trust any boy anywhere that reads the SCIENTIFIC AMERICAN."