

THE LIGHT OF SCIENCE

RECENT DISCOVERIES IN DIFFERENT SCHOOLS

Something About the Mysterious Chamber of Heron—Improvements in Weaving Machinery—A New Shadowless Lamp—Chemical Discoveries.

A Weaving Spool

In order to meet the objection presented, especially in transit, to the great disproportion between the weight of the reels or spools and that of the silk or cotton wound on them, in some instances 84 per cent of the weight being wood and only 15 per cent actual silk—a spool has been invented, according to the London Times, which, from its lightness, is called the feather weight. This spool, which is of 3/16 inches diameter, and of the thickness of a visiting card, is formed of serrations or ribs around its circumference, which produce ears of petal-shaped projections radiating from the center. It is made from celluloid, the chemical character of this neutralizing the resin which is retained in the ordinary wood reels and which supports insect life, to the detriment of the goods, especially when exported to certain countries. The silk, cotton or thread is rapidly wound on these spools by means of a newly invented machine, in which there are arrangements for measuring the length of silk required to be wound upon each spool, the winding being automatically stopped as soon as the necessary length has been reached. Ten of these spools, when bare or empty, weigh on an average, it is stated, the same as one ordinary empty reel, and each spool is capable of carrying the same length of silk thread as the reel. The space required for the new spools is, of course, much less than for the old.

The accompanying engravings represent the construction of a chamber of Heron, which are opened by kindling a fire in the altar, and which closes automatically when the fire goes out.

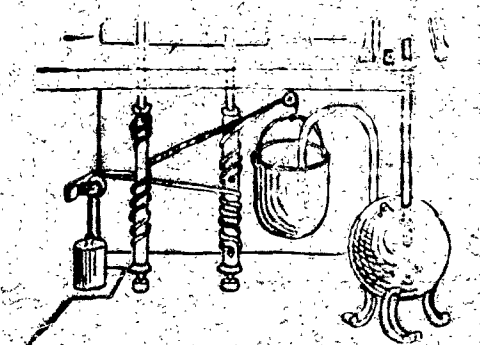


MYSTERIOUS CHAMBER OF HERON.

out. This apparatus is described and illustrated in a work entitled "Les Origines de la Science," by Albert de Rochas, to which we are indebted for the cuts and description.

When a fire is lighted on the altar, which is hollow, the air contained within will expand and will be forced into the globe beneath, and will force the water contained therein through the bent tube into the pall, which is suspended by cords passing over a pulley and wound around two movable cylinders, which are the prolongation of the axes by means of which the doors are operated. Two other cords are wound around these same cylinders in an opposite sense, and after passing over a pulley support a counterbalance weight at the outer end. When, therefore, the water passes into the receptacle the equilibrium will be disturbed, and the receptacle will descend and the cylinders will be rotated, thereby opening the doors with which they are connected.

The operation is reversed when the doors are closed. The bent tube which connects the pall and the globe forms a siphon, the longest arm being on the inside of the globe. When, therefore, the fire on the altar is extinguished, the air in the altar and globe becomes cold and diminishes in volume and forms a partial vacuum, which draws the water from the pall into the globe. When all the water in the pall has been withdrawn, the receptacle will rise under the influence of the counterbalance weight, and this weight, by means of its cords, will rotate the cylinders in the reverse direction and will close the doors of the chamber. Heron states that mercury may be substituted for water.



OPERATING THE DOORS OF THE CHAMBER WITH HEAT.

which in some cases may be of advantage, because of the greater weight of the mercury.

Prof. Tyndall's Idea.

One of the most interesting contributions to practical science has been made by Prof. Tyndall in respect to cleavage, or lamination, his researches proving that any material, no matter how plastic or how homogeneous it may be, has within it the condition or the development of cleavage, and that the only external condition necessary to produce lamination is a sufficient degree of pressure exerted in one direction upon the mass; the resulting planes of cleavage will be at right angles with the direction in which the pressure is applied. The philosophy of this effect, as explained, lies in the fact that, as relates to the cohesion of the particles, no substance is strictly homogeneous—that is, the particles, granules or molecules of substances do not possess cohesive power in all directions; consequently, when pressure is applied to them, they slide over each other—the sliding surfaces being those of least cohesive power—and move toward a point of less pressure; in the case where pressure is applied in one direction only, the sliding will be in a direction at right angles with the direction of the pressure, and thus plates, lamina or strata, are generated in the mass, the limiting faces of these layers having less cohesion than their interior parts.

A Shadowless Lamp.

The latest reported improvement in lamps is a device intended to obliterate the objectionable shadow thrown on the ceiling by most regenerative lamps, and to overcome some other features which detract from the value of the principle. The difficulty of the shade thrown upward is met by forming the upper part of the lamp of etched ornamental glass instead of having a metal dome, as is ordinarily the case. A good illumination is thus obtained without the loss of any downward light—two streams of hot air are supplied to the burners, one being heated by means of the regenerator, which is of cast iron, the other being warmed in its passage through the lamp casing. Another point dealt with in this construction, is the deposit of carbon on the ceiling, which is usual with such lamps; this is practically reduced to nothing, first by the small amount of gas burned per hour and the perfect combustion obtained, and the next by the products of combustion being emitted from the lamp laterally instead of being projected upward toward the ceiling. This arrangement has the merit of simplicity, and the effect is very satisfactory.

Photography.

A recent improvement in photography enables the artist to overcome to a considerable extent the difficulty of preserving the natural expression of the sitter during the necessary period of exposure. It seems that notwithstanding this period has been greatly shortened in various ways, particularly by the adoption to such an extent of the magnesium light, with its unique advantages, nervousness is so prevalent among those who sit before the camera that the operator has still found the interval too prolonged for the perfect accomplishment of his work. Herr Haag of Stuttgart claims to meet and overcome the trouble in question by means of a change in the management of the magnesium light, making, for this purpose, what are called lightning cartidges, which cause a tremendous development of luminosity, and are set alight in one-tenth of a second by means of electricity. The so-called natural photo-graphs taken by this process are said to preserve the mental expression and momentary play of the features with extraordinary clearness and exactitude, but the operation requires so much skill and practice that it is said to be carried on by only a single photographer in Berlin.

A New Concrete.

A successful application has been made, it appears, of the newly invented road concrete, some time ago described in the papers of Germany, and its usefulness in various directions seems to be assured. Curious enough, shavings and planing mill chips, either of common or fancy woods, and which may be obtained before use if desired, are mixed with cement or rather, casing, and calcined magnesite limestone, glycerine, dilute acid of soda, and a little linseed oil, and this combination of substances is forced by hydraulic pressure into moulds where it is allowed sufficient time to harden. When dry, the composition is strong and solid, and can be sawed, planed, polished and varnished. Among its various proposed uses are ornamental panels and wall surface coverings, etc.

Morland's Folding Chair.



Tannic Acid.

One of the great troubles in using tannic acid, or tannin matters in general, according to The Dyer, is that, on keeping, the tannic acid gradually passes into gallic acid, resulting in a loss of mordanting power. This change being greatest at moderately high temperatures; and as in either the operation of mordanting cotton or in tanning leather a large excess of tannic acid must be employed to effect good results, it follows that there must be a great loss in the operation, owing to the decomposition of the tannic acid into gallic acid. If this could be prevented, a great saving would result, as the baths could be retained, and would only require new material to restore the original strength, the life of the bath being thus prolonged and the cost of the tannic acid reduced.

Some time ago for preventing the loss of tannin, the process consisting essentially of keeping the baths at a temperature of 40 degrees F., this being done by arranging a number of coils of pipe in the vat containing the tannin liquors, and passing through the coils brine from a refrigerating machine, the decomposition of the tannic acid being prevented at such a temperature.

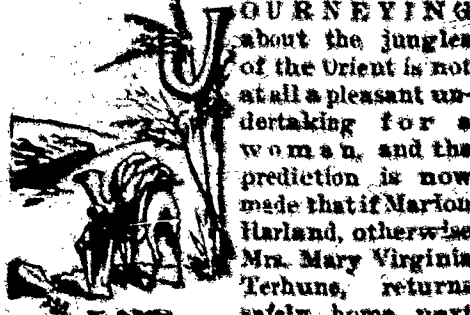
For Ventilating Sewers.

Some of the English towns and cities have introduced a device for ventilating sewers—a Bunsen gas burner operating to heat to a high temperature a series of cast iron covers over the surfaces of which the sewer-gases have to pass on their way out to the atmosphere, which by such contact are entirely destroyed. In order to obviate all danger of explosion caused by leakage, this new safety furnace consists of a series of cylindrical rings or segments, each mechanically fitted; an intermediate ring divides the combustion chamber from the vertical air passages formed between the inner and outer rings of the furnace; the heat of the furnace is conveyed to the outer ring by means of thick cast iron webs that form tiers of air channels through which the uprising sewer air passes, and the burner is supplied with gas taken from the outside of the "destructor column."

TRIP TO THE ORIENT.

DARING JOURNEY OF MARION HARLAND.

Will Face Four Months Among the Bedouins and Lepers of the Syrian Wilds—Never Before Attempted by a Woman.



JOURNEYING about the jungles of the Orient is not at all a pleasant undertaking for a woman, and the prediction is now made that Marion Harland, otherwise Mrs. Mary Virginia Terhune, returns safely home next March from the voyage which began recently, she will have accomplished what no white woman has ever yet done, and what she herself has been planning to do for twenty years. Her undertaking is a pilgrimage through the desert of Syria to the Bedouins and lepers of that region, varied by a week's stay as an inmate in the most noted harem of Damascus, and visits to the Druses of Carmel, the Sea of Tiberias, the tomb of Abraham at Hebron and to the grand rabbi of Jerusalem, who will bestow his blessings upon her. The lady is to be accompanied only by her son, a youth who is six feet three inches in height and 19 years of age, except that upon entering the Holy Land David Jamal, the Oriental dragon, will become her guide, and a Syrian woman is there to enter Mrs. Terhune's service, and they, with a few native porters, will comprise the entire party. Mr. Louis Klopsch, proprietor of the Christian Herald, planned this unique journey and pays the bills.

Mrs. Terhune is now crossing Europe by rail to Brindisi, and goes by boat to Jaffa, thence over the only railway in that region to Jerusalem. Here the grand rabbi, through the courtesy of Mr. Selah Merrill, our Consul at Jerusalem, has agreed to formally receive the American woman, impart his blessings and give her letters which are expected to prove a sort of open sesame throughout the journey. At Jerusalem Mrs. Terhune dons the oriental dress, consisting of a long, loose robe, the turban and a "yashmak"—the close veil which will conceal all of her face and have a solitary hole in it for her to see through.

From this time on Jamal, the dragon, becomes an important personage in the lady's daily life, and excepting only Albert Payson Terhune, her son, the only man she can feel at all safe with. This man has been in the United States and has lectured here and in Europe not long ago. His wild adventures would, in the platitudinous phrase, fill a book. He is well acquainted with the Duke of Connaught, Rev. T. De Witt Talmage and others who have visited his people.

With letters commending her to all the tribes in Syria as far as Damascus and Beyrout, Mrs. Terhune will voyage on the back of a camel, the commander of the little party armed to the teeth, until Hebron is reached. On the way, she will practice with the sabre and the fisticuff, to protect herself should necessity arise from robbers and native violence. The next stop will be at Nazareth and after that Bethlehem, wherein Christmas will be passed. Early in January the little party hopes to reach Tiberias, where Mrs. Terhune intends to participate in the religious custom of washing the bodies of the dead in the sea. This will be among the most perilous parts of the journey, owing to native frenzy at the time and the embarrassing habit of running amuck to which ladies and gentlemen in that country are addicted.

Across the Jordan next to the land of Moab Mrs. Terhune will send her son ahead to beg admission for weary voyagers according to the quaint custom at the convent of Mar-Saba, the oldest Christian convent in the world. There is no doubt of her being admitted. Here the party will replenish their stores and Jamal will have to exert his influence among the Bedouins, the wandering robbers of this region. For Mrs. Terhune has resolved to pass at least a week among these people, living in their tent and taking part in their weird customs. The negotiations incident to this part of the trip will require no end of diplomatic maneuvers, for if there came a struggle with a rival tribe during the lady's stay among them her death might be the result. It will require some days after leaving the convent to arrive among the Bedouins.



AN INMATE OF A DAMASCAN HAREM.

Should Mrs. Terhune get safely away from the Bedouins she will find her way, or rather the camel she is riding will be steered in the direction of the Druses of Carmel. These people have a far-away settlement over the desert, being descendants of the unhappy people of whom thousands were massacred by the Turks in 1864. They are very savage and fierce, but the lady, which Mrs. Terhune expects to leave from the grand rabbi, will, it is believed, prompt them to welcome her.

Then and His Way.

It is said that when readers little; he declares that he "will not be drawn away from himself." He has been afraid of the judgment of Paris, "Parisians," he said, "are so wicked that it is strange they should take any interest in my ways." He doesn't understand why they should indulge in philosophical speculations concerning his fallacious personages, who are very real and perfectly simple to him. "I live in the reality of my character," he says, "and to such an extent that I could count the number of buttons they have on their coats." One who knows him well says that he has no intimate friends; that the only person who has any authority over him is his wife. He has a high opinion of women and a very poor one of men. He doesn't care to engage in a scientific or social campaign. "I am a spectator, and so to speak," he says.

has received the proposition to take part in the religious festival here and so with the annual hunting expedition into the wilds of this territory.

Damascus, the Paris of the Orient, is to be the scene of Mrs. Terhune's next experiences. At least a week will be spent by her in the harem of a wealthy resident. The lady means to gain admittance nominally as a slave to wait upon the favorite of the owner, Jamal, and the young son are to visit the gardens of Damascus every other day, where the nominal slave is to pass with a load of wood on her head and nod if all is well. She will be obliged to wear white sandals and the hood of a duenna all this time. The only way in which Mrs. Terhune could go into a harem, even on these terms, was by securing a letter through the influence of the grand rabbi, to the chief of the sunnites, who, in turn, induced a local magistrate with thirty-seven wives or so to consent to the arrangement.

After these experiences are through with the intrepid voyager will go among the lepers of Damascus. There is Naaman's house of lepers in the city, at which Mrs. Terhune will apply for leave to converse and mingle with the afflicted creatures. This, also, is an affair for delicate management, but before she left New York assurances were ob-



MARION HARLAND.

tained through our diplomatic representations in the Orient, that it could be managed. Mrs. Terhune's idea is to see if the alleged wrongs of the lepers can not be righted by efforts of Christians in this country. It is well known that an eminent American philanthropist has long wished to secure an authentic report upon the condition of the world's lepers. Such a report does not exist, and the efforts of well disposed persons to solve this growing problem of the leper are thus rendered nugatory. Mrs. Terhune means to investigate the Damascus settlements in the interest of this cause. Physicians here have stated that there is no fear of contagion, and it is believed that the lady can secure by a week's sojourn among these unfortunate all that is needed for the information of their well wishers.

Mrs. Terhune carries with her letters of introduction to the local leaders of Damascus—that is, the native aristocracy—the wealth of whom is immense, and her life in the city's palaces is expected to pleasantly vary the rigors of her other experiences.

After Damascus comes the trip to Beyrout. Here the native tribes have dubiously distinguished themselves by treacherous murders of tourists, and the influence of Jamal must again prove the party's guarantee of safety. The robbers of this region have a way of ambushing voyagers, and to meet these, should any come, Mrs. Terhune has planned to familiarize herself with all the weapons of the country as she journeys. It is planned that she will rise with the sun, don the turban and yashmak, but varying the Oriental attire with a skirt reaching to her knees. Then high boots and a belt bristling with dirks and daggers are to impart a fierce air to the domestic reformer. She will indulge in pistol practice each morning as her camel jolts along, and regularly the fair voyager and her giant son will fight a mimic combat with daggers to give the two an idea of the proper way to resist the native brigands. It is further arranged that should the lady be captured news of the circumstances will be sent in her failure to report at certain signal stations along the route.

Canon Tristram attempted a pilgrimage, something like Marion Harland's present journey, but was captured with his entire caravan by the Bedouins in whose tents Mrs. Terhune means to pass a week. They held the distinguished divine for a long time, until at last he was ransomed. The experience nearly cost him his life.

After the stop in the Beyrout region Mrs. Terhune's voyage will be over. She means to return in a civilized manner, donning the Oriental toggery, and visiting such scenes of interest on the way home as may seem worth the trouble. Should no accidents happen and everything be accomplished according to present plans, the lady and her son will be back in New York by March.

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