Pliable Glass.

A translucent material intended for use as a substitute for glass has been introduced in London. This material exhibits the quality of pliancy in the greatest degree; in fact, it may be bent backward and forward like leather, and be subjected to very considerable tensile strain with impunity. It is almost as translucent as glass, and is of a pleasing amber color, varying in shade from very light golden to pale brown. The basis of the material is a web of fine iron wire, with warp and weft threads about 1-12 in. apart. This is inclosed, like a fly in amber, in a sheet of translucent varnish, of which the base is linseed oil. There is no resin or gum in the varnish, and once it has become dry it will stand heat and damp without suffering any change, neither hardening nor becoming sticky. The manufacture is carried out by dipping the sheets edgewise into deep tanks of varnish and then allowing the coating which they thus receive to dry in a warm atmosphere. It requires more than a dozen dips to bring the sheet to the required thickness, and when this has been accomplished it is stored for several weeks to thoroughly set.

It will be readily understood that a material produced in this manner will not be as cheap as glass in its first cost. If it is to obtain a place in the market, it must be either from its greater advantages or from some saving which it effects in the items of erection and maintenance. It is claimed for the woven roofing that it is economical in every way. It absolutely abolishes breakages; a man may fall upon it or drop a ladder upon it without damage. The large size of the sheets, 10 ft. by 4 ft., renders the joints very few, and these can be made absolutely tight by the use of varnish between the overlapping edges. No glazier is required to apply the material; it can be cut by a pair of strong scissors, and be nailed in place by any ordinary workman. The frames to carry it may be extremely light, and their construction of the simplest. Curved surfaces can be glazed as easily as flat, and if a great amount of light be required, the entire roofing may be made of this material. The sun's heat gets through with difficulty, so that no awnings are needed. It can be seen in London in the Westminster Aquarium, which has been lately reroofed by it, greatly to the comfort of the audience.

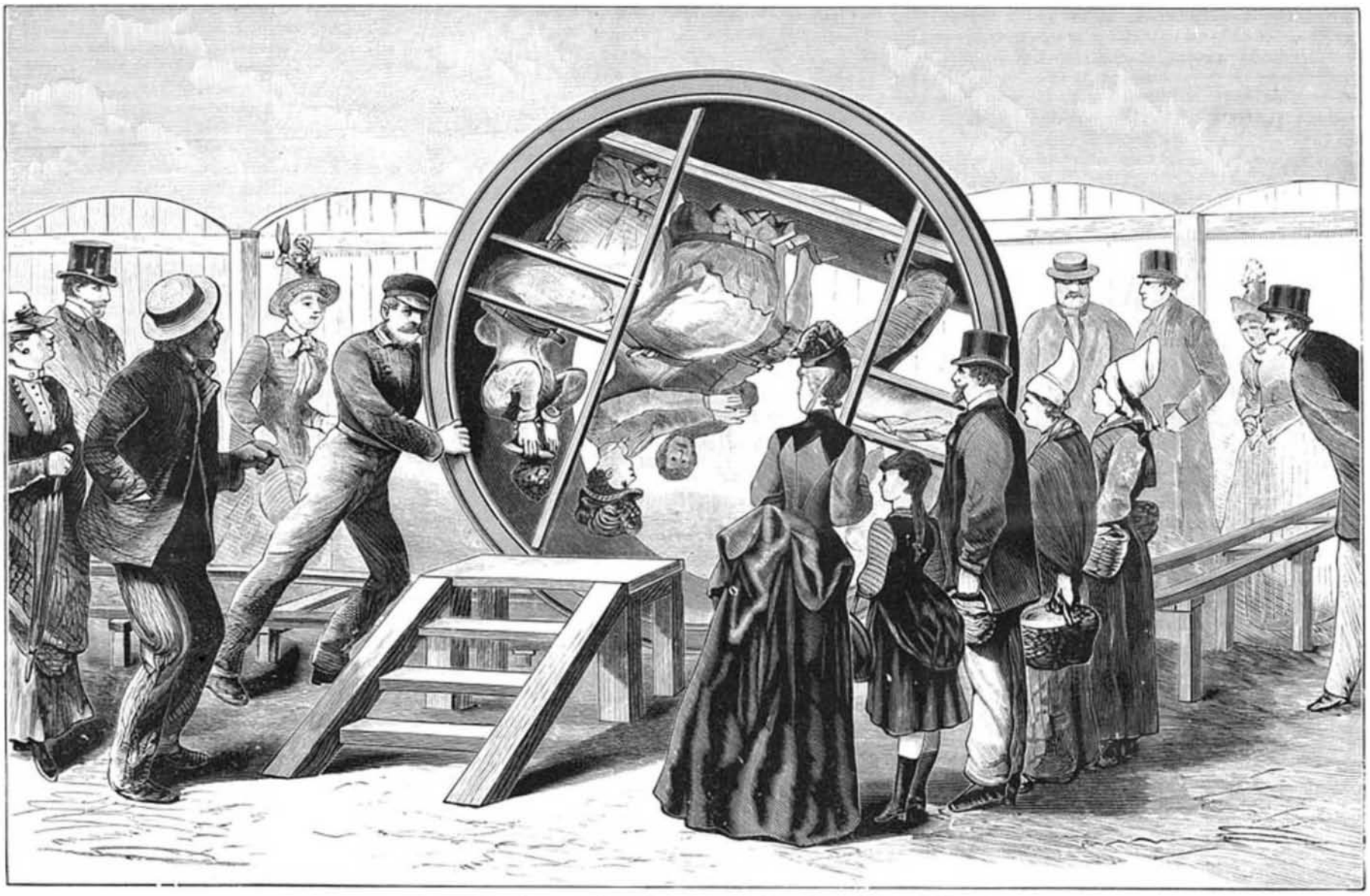
How to Purify Salt.

Mr. Samuel F. Garrigues, of Ann Arbor, Mich., an extensive miner, refiner, and operator in salt, says, in relation to the purification of the manufactured salt, and especially in freeing it from the sulphates which operate so injuriously against its use for dairy purposes, the end could be obtained in the most perfect and yet the most simple manner by leaching the salt with a saturated solution of itself. In other words, said he, to purify a barrel of this salt all that you have to do is to dissolve a peck of it in cold water to saturation, add a small amount of sodium bicarbonate, and pour this into the barrel, having previously provided an exit by boring a hole in the bottom of the container. The saturated brine runs through, dissolves the impurities, and carries them off, but being saturated with chloride of sodium, it, of course, no longer attacks that substance.

THE CENTRIFUGAL BARREL.

The most successful part of the present Brussels Exposition is the garden, with its numerous restaurants and saloons, where the characteristic refreshments, wines, liquors, etc., of all nations attract the visitor, whether he is thirsty or not, and give to the whole more the appearance of a scene from a Flemish kirmess *a la* Rubens or Tenier than of an international industrial exposition.

This impression is heightened by the fact that the large garden is filled with show booths and amusements of all kinds, which, it has been correctly said, resemble a Vienna "Wurstlprater." We find there an open circus, a switchback under the pretentious name of "Montagnes Russes," a "Tonneau d'amour," which reminds one of the "Fasselrutschen" at Kahlenberg, near Vienna, on Leopold day. It consists of a cask which, after the occupants have been firmly secured in their places, is rolled about, the women screaming, of course, when they revolve rapidly around the axis of the cask.—*Illustrirte Zeitung.*



THE BRUSSELS EXPOSITION—THE CENTRIFUGAL BARREL.

Alteration of Water Colors.

After a discussion of the subject in the English Society of Aquarellists, two distinguished physicists, Messrs. Russell and Abbey, were delegated to study the action of light and air upon water colors. After two years of research, these two gentlemen have just rendered their report.

In order to ascertain the action of broad daylight, the experimenters painted strips of Whatman's paper with all colors and various mixtures, and then inclosed them in thin glass tubes, which they fixed against a wall facing the south—some of them exposed to the full light and others covered with an opaque veil. After twenty-one months, the following colors (given in the order of the extent of the alteration) were changed: Carmine, crimson lake, madder red, scarlet lake, Payne's gray, Naples yellow, olive green, indigo, purple madder, gamboge, Vandyke brown, Indian yellow, cadmium yellow, Leitch's blue, violet carmine, purple carmine, sepia, aureoline, rose madder, permanent blue, Antwerp blue, madder lake, vermilion, emerald green, and umber. The following colors remained unaltered: Yellow ocher, Indian red, Venetian red, burnt sienna, chrome yellow, lemon yellow, raw sienna, oxide of chromium, Prussian blue, cobalt, French blue, and ultramarine ash. As for the thirty-four mixtures experimented with, only three remained entirely unaltered.

Messrs. Russell and Abbey made a second series of experiments for the purpose of determining how water colors and their mixtures behave every day in the ordinary atmosphere of a room. Fifteen colors and eleven mixtures were experimented with. Gamboge, indigo, and Naples yellow were but slightly altered, while all the other colors, as well as the mixtures, faded.

Finally, the two experimenters set out to discover what happens to colors placed in damp air, in hydrogen, in a vacuum, and under the influence of illuminating gas. They found, for example, that Prussian blue and Antwerp blue are totally destroyed by damp air, that illuminating gas has scarcely any effect upon colors, and that broad daylight has no perceptible action upon colors placed in a vacuum.

The Enormous Results from Natural Gas.

"Few people outside of the natural gas region," said a large owner of gas wells in Washington County, Pa., "have any idea what enormous proportions the gas business has grown to. It may be said to be only about two years old in western Pennsylvania, and more than 200 000 acres of land in Washington and adjoining counties have been drilled with gas wells. Nearly 150,000 tons of iron have been used in manufacturing the pipes through which the 500,000,000 cubic feet of gas flows from the region daily to the places using it. Over $25,000,000 is invested in the business by the fourteen organized companies that produce the bulk of the gas. The land and wells represent an outlay of $17,000,000. The wells now producing are capable of doubling the quantity now demanded for light and heat. Nearly 2,000 miles of pipes are required for conducting the supply to consumers. It is estimated that the use of natural gas has displaced 25,000 tons of coal daily in western Pennsylvania and eastern Ohio alone. Besides the wells controlled by the gas-producing companies, individual owners have wells for the supply of smaller towns, and every village and hamlet in the region has enough natural gas running to waste every day to abundantly supply the same number of towns of 10,000 inhabitants each with light and fuel.—*Light and Heat.*

Inherited Deficiency of a Tooth.

Dr. Cryer says, in the Philadelphia *Medical Times*, that he has, among his patients, members of the same family, representing five generations, each lacking the left lower lateral incisor tooth. An interesting feature of this remarkable instance of heredity is that one of the members of the same family has a supernumerary lower incisor.

An Electric Mountain Railway.

This has recently been opened to the public at the Burgenstock, near Lucerne. Under the superintendence of M. Abt, the rails describe one grand curve formed upon an angle of 112 degrees, and, by an arrangement of the Abt system, the journey is made as steadily and smoothly as upon any of the straight funicular lines previously constructed. The Burgenstock being almost perpendicular, it would have been impossible to construct a railway upon the old plan. From the shore of the Lake of Lucerne to the Burgenstock is 1,330 feet, and it is 2,860 feet above the level of the sea. The total length of the line is 938 meters, and it commences with a gradient of 32 per cent, which is increased to 58 per cent after the first 400 meters, and this is maintained for the rest of the journey. A single pair of rails is used throughout, with the exception of a few yards at half distance to permit the two cars to pass. Through the opposition of the Swiss government, each car is at the present time only allowed to run the half distance, and they insist upon the passengers changing, in order, as they say, to avoid collision or accident. The motive power, electricity, is generated by two dynamos, each of 25 horse power, which are worked by a water wheel of nominally 125 horse power, erected upon the river Aar at its mouth at Buochs, three miles away. The electric current is conducted by means of insulated copper wires. The loss in transmission is estimated at 25 per cent.

Export Museums in Germany.

The Germans still seem to find their export museums very useful, if one may judge by the increasing number of such institutions, and the care with which they are being developed. These museums are now in existence at Stuttgart, Berlin, Munich, Cologne, Frankfort, and other places in Germany. With regard to that at Frankfort, British Consul-General Oppenheimer has recently reported at some length. He states that these export museums are looked upon with growing interest, inasmuch as they "greatly contribute to extend German intercourse with foreign countries."

The Frankfort Export Museum is said to serve as the means of informing the manufacturers and merchants of the district as to the articles most current abroad, giving them the prices realized, stating the mode of packing most in favor, the quantities sold, the local charges, the period for which credit is asked and given, and so forth. An import museum forms an essential part of the Frankfort institution, its object being to make manufacturers and merchants acquainted with the raw materials which may be made useful for various technical and industrial purposes. All possible information is given as to these materials. An information office constitutes another part of the Frankfort Museum. It contains statistics of all kinds, technical and commercial periodicals, reports, particulars of customs tariffs, and so on.

Information, samples, etc., are constantly received by all these museums from the German consulates all over the world. At Frankfort there are also export sample rooms, where there are exhibited samples, designs, show cards, price lists, etc., giving exact prices, weights, measures, and all other necessary details in German, English, and French.

Thus the Germans appear to cultivate these institutions with care. They do so, it is stated, because they find in them a means of more economical, more permanent, and more effective representation than exhibitions, which involve heavy expenses. In taking this view the Germans are probably right, seeing that the majority of exhibitions are now of no use whatever save as a very expensive means of advertising to the general public. That impression is spreading in this country, but up to the present it cannot be said that there is anything like a general movement in the direction of export museums or sample rooms. Such museums are, perhaps, better fitted for a rising industrial nation like Germany than for Great Britain, yet we should probably be wise not to neglect an idea which appears to be found so useful by those who are undoubtedly our most earnest and most serious commercial competitors.—*The Ironmonger.*

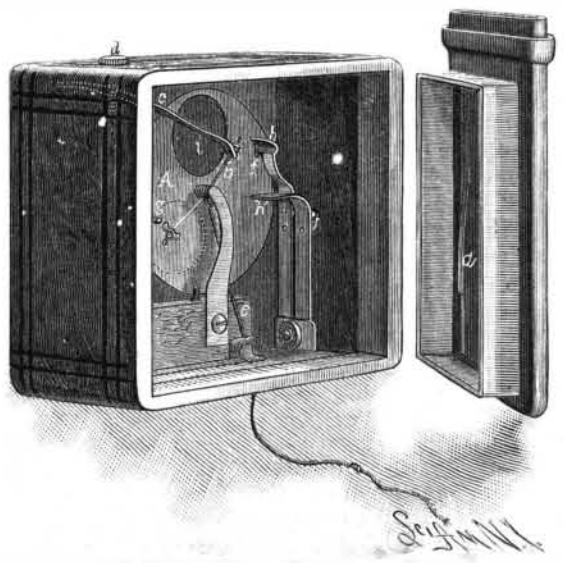
An American Parachutist in England.

On the evening of September 1 Professor Baldwin, the daring American aeronaut, for the tenth time successfully performed his feat of dropping from a balloon at the Alexandra Palace, London, in the presence of many thousands of spectators, among whom were Major Templer, of the Military Ballooning Department, Chatham; Mr. Lefevre, president of the Balloon Society of Great Britain; and others interested scientifically in the question of aerial navigation. The ascent with the balloon was made by Professor Baldwin from the North Park, and he dropped away from the balloon with his patent parachute at an altitude of about 1,200 feet, and safely descended just outside the palace fence on the Wood-green side. The balloon fell at Wood-green. Afterward there was a large gathering of visitors in the central hall of the palace to witness the presentation of a gold medal to Mr. Baldwin by the Balloon Society.

A POCKET CAMERA.

BY GEO. M. HOPKINS.

No equipment for a tour or a summer's vacation is now complete without a photographic outfit for making instantaneous memoranda of scenes and objects met with upon the road, on the river or lake, or in the picturesque nooks of mountain and valley. The principal trouble with photography in these days is not with the plates and chemicals, as of old, but with the more or less cumbersome camera and accessories, which



INTERIOR OF POCKET CAMERA.

must be ever present with the artist, making him an object of curiosity wherever he may go.

If large pictures are desired, a large camera and tripod of corresponding size will, of course, be required. To these must be added a complement of plate holders if a number of pictures are to be made in a short time. Some of the recently devised cameras are very portable, and in every way desirable. The writer adds to the list an instrument which differs in some respects from others. The principal feature is the plate-changing device, which is quite simple and admits of the use of flexible bags for holding the plates before and after exposure. The bags—which hold one plate each—are made of the stout black paper known in the trade as leatherette. Each bag has a very thin covering of leather, such as is used by bookbinders on very light work, and around the mouth of the bag is glued a band of thin, tough pasteboard. The bags are made over a wooden form. A dozen filled bags occupy very little more room than the plates in the original package. The light is excluded, and the plates are held in the bags by folding over the top, as shown in the engraving. Each bag is provided with a rubber band extending around it lengthwise, to prevent it from unfolding.

A POCKET CAMERA.

In the present case, the plate holder proper is made of brass and fitted to the camera box, from which it is never removed, except in case of some disarrangement of the interior parts of the camera. The holder consists of a flat sheath, made of suitable size to readily admit the plate, and provided with an opening in the front side, of the size of the field of the lens. This opening is surrounded by a flange which fits light-tight into the camera box.

Two light bowed springs, *a*, are soldered to the back of the sheath, and tend to press the plate forward to bring the film into the focal plane.

The end of the sheath, which projects upward above the top of the camera box, is of suitable size to be received in the stiffened ends of the bags, and a channel is formed around the end of the sheath near its upper end by soldering an angled strip of brass around the mouth of the sheath, as shown in Fig. 1. Into this channel the stiffened end of the bag is inserted before it is unfolded. The channel is blackened, so that when the end of the bag is inserted in it, no light can enter. Now, by straightening the bag and shaking the camera, the plate contained by the bag will be made to fall into the holder. The bag can now be folded against the back of the holder and held there by one of the elastic bands extending over the top and under the bottom of the box. The removal of the plate from the camera is simply the reverse of what has just been described; that is, the bag is unfolded, and the camera being inverted, the plate is dropped into the bag, when the bag is again folded and removed from the holder.

The shutter of this little camera is both simple and effective. It admits of instantaneous and time exposures, and can readily be adjusted to any required speed without opening the camera box.

The shutter consists of a light metallic disk, A, provided with a central boss arranged to turn on a stud projecting from a plate secured to the inner surface of the front of the box. A stout but fine cord, *b*, is attached by one end to a small loop soldered to the face of the shutter and wound once around the boss of the shutter; the remaining end passes through a hole in the end of the spring, *c*. A screw, *d*, passes through the top of the camera, through a slot in the spring, *c*, the nut being fitted to the slot of the spring and provided with shoulders which support the spring. By turning the screw, *d*, the spring may be made to turn the shutter with more or less rapidity, as may be required. A cord, *e*, inserted in an eye on the boss of the shutter and wound in a direction opposite that of the cord, *b*, passes out through a hole in the box and serves to set the shutter.

The shutter is provided with two small studs, *f g*, the stud, *f*, being arranged near the periphery of the disk, in position to be engaged by the spring catch, *h*, when the shutter is drawn around by the cord, *e*, preparatory to making an instantaneous exposure. The stud, *g*, is placed in such a position relative to the catch, *h'*, that its engagement with the catch will hold the shutter open, or with its opening, *i*, coincident with the opening of the tube, as indicated in dotted lines.

The catch, *h'*, is provided with a wire arm, *j*, which extends behind the catch, *h*, in such a way as to allow the catch, *h'*, to move a short distance before releasing the catch, *h*. Each catch is provided with a stud which projects through the camera box and presses against the leather covering, forming two small convex projections, *l*, *m*. When an instantaneous exposure is desired, the shutter is released by pressing the projection, *l*. When a time exposure is to be made, the button, *m*, is pressed. This operation first throws the catch, *h'*, into the path of the stud, *g*, thus releasing the stud, *f*, allowing the shutter to turn until the stud, *g*, strikes the catch, *h*. This will arrest the shutter in an open position. When the catch, *h'*, is released, the shutter closes. For time exposures the camera box may be placed on any convenient support.

For instantaneous exposures, the camera may be held in the hand. One desiring to make a camera of this kind, and having the proper facilities, could substitute a toothed sector and pinion for the shutter boss and the cords used in operating it.

The camera lens is of the spherical, wide angle kind, with a fixed focus for all distances from five feet upward.

The camera box is 2 inches deep and 3½ inches square, outside measurement. The camera was designed especially as a tourist's companion for taking lantern views, and it has served its purpose very well indeed.

Hydrogen for Balloons.

While experiments are being made in England to solve the problem of the manufacture of balloon hydrogen by electrolysis, *Iron* informs us that Messrs. Majert and Richter have devised, had constructed, and successfully experimented with, at Berlin, an apparatus that does away with the inconveniences of former processes. The hydrogen is obtained by heating a mixture of slaked lime and powdered zinc, the carriage of which on a campaign is rendered easy by inclosing it in tin cartridges. The water of the slaked lime is decomposed by the zinc, and, as a result, there is obtained a pure gas, free from arseniated hydrogen, which is so dangerous to man, and from sulphuric acid, which is so injurious to the balloon. The apparatus for producing the gas is heated by any combustible whatever. It is in the form of a small locomotive, and is easily drawn by four horses. In front, there is a seat for two men, which can be removed in a minute and be replaced by a chimney. The fire is started, and in six minutes the cartridges are red hot. As soon as this temperature is reached, the cartridges are introduced into the retort, and five minutes afterward the production of hydrogen goes on normally. With 120 cartridges, about 390 cubic feet per hour are obtained. A military balloon of ordinary dimensions can, therefore, be inflated in three hours.—*La Nature.*