#### ALUMINUM IRON AND STEEL.

T. Nordenfelt, of London, has taken the following English patent:

It is well known that one of the great difficulties in making castings from steel is to get a product which is solid, sound, homogeneous, or free from blisters or cavities. Lately the manufacture has been much improved by adding to the metal ferro-manganese and other compounds containing carbon, silicon, and manganese. But although these admixtures make the quality in other respects, as the product gets harder their strength.

I have found that castings of wrought iron or mild: runs easily into the moulds, and a more perfect product ganers, and provision for other winter diversions is obtained. I have found that even a minute quantity appreciable influence.

By this, my new invention, I have succeeded in makwhich castings in every respect retain their ductility strength is greatly enhanced.

The iron or steel is melted in crucibles, converters, or metal smelting furnaces of any description, and the addition of the aluminum or alloy of aluminum is earlier.

It is convenient to provide a plug in the cover of the crucible, which is removed when the metal is completely melted, a tube is inserted into the aperture, and the aluminum to be added is passed down the tube. The tube is removed and the plug replaced, and the metal is soon ready for pouring.

What I claim as my improvements in the manufacture of castings from wrought iron and steel is the admixture of metallic aluminum or aluminum alloy with the melted iron or steel before casting the same into moulds, substantially as described.

## THE ICE PALACE AT ST. PAUL.

BY H. C. HOVEY

The saying that "men are but grown-up children" is well illustrated by the building of costly edifices of a substance known to be ephemeral in its nature, and the paper in position to receive the enlarged image, and that can be of no conceivable utility while they last, fulfilled the purpose very perfectly. Yet they take their place among human affairs, and are occasionally worth describing even in the sober columns of a scientific journal.

The "St. Paul Ice Palace and Winter Carnival Association" has been incorporated for the term of thirty years, with the intention of building a palace and holding a festival every winter. The success of its first attempt has been marred by the remarkable instability of the weather—which can usually be depended on in this latitude. While the have been a few very cold days, this has been comparatively "an open winter;" and fears were at one time had that the project would caught at the other side of the screen by a flat spring actually have to be postponed to another year. But, catch. at last, a favorable cold snap came, and the structure

much like building with granite or marble; yet it has ular box about six inches square, divided into two in nine cases out of ten, is in having too much rather its peculiarities. The quarry is the frozen Mississippi parts, the upper portion being hinged at the rear up-than too little.—N. E. Farmer. River, from which blocks may now be cut twenty inches per corner. When the cover was opened, the paper, thick and as clear as crystal. The first thing done is to could be fed out of its lower corner directly on to the scrape off the snow and soft surface ice, which is effect- | face of the exposing screen. The roll of sensitive paper ually done by a wooden scraper fifteen feet long, drawn having in its center a wood spool, was supported beby horses. Next the smooth surface is marked off by tween two uprights fixed on the inside ends of the box, steel knives set in a wooden beam, the area thus treated so arranged that the spool could be easily lifted out or that will show it to advantage. Soft projections may resembling an immense checker-board. These teeth dropped into place. A spring pressure bar pressed be held in position with threads suspended from a are adjustable, so that blocks of the various sizes re- against the surface of the roll, preventing it from un- frame or from a heavy cord stretched across the room. quired can be marked off. Sawyers then cut the ice, winding too rapidly. llowing the lines already thus traced. By means of hooks and poles, the blocks are lifted from the water then the cover of the box; the free end of the paper was on with single and quick strokes, that the rapid cooling and placed on long sleds in waiting, and drawn to the next brought down over the face of the exposing screen; of the paraffine may not cause the brush to adhere to site of the building. Heavy tongs and derricks are then the lid of the box was dropped, and the door the preparation, thus drawing the soft tissues out of next in requisition to swing the blocks to their places, frame shut and latched, which firmly clamped all the place, until the mould is formed about one-eighth inch where masons are ready with suitable tools for chip-edges of the paper in position and prevented it from thick; all undercuts must be well filled. When the ping off the rough parts, so that each block shall fit | curling. After exposure, it was only necessary to mould is hard, it can be readily separated from the presnugly to its place. Water is then poured into the cut off the exposed portion with a pen knife and tuck paration; it is then well washed with cold water. Stir seams, where the cold at once congeals it, thus cementing the wall as it goes up. Work so simple as this pro- the roll. The operation of affixing the paper was ex- cream, pour into the mould and out again several gresses rapidly, and repairs that may be needed can be tremely simple, entirely dispensing with the bother of: times, so that there will be no air bubbles on the surreadily made as long as cold weather lasts.

A noble location was secured for the ice palace, comprising eight acres in the very heart of the city, and was adaptable to different widths and rolls of paper, until the paraffine is all melted; wash with clean boiladjacent to the State Capitol. In the center of this broad area rises the glittering structure, 180 ft. long, tion. It will be seen that the convenience afforded painted with oil colors by coating it first with shellac 154 ft. wide, with towers 106 ft. high. The architectural design is excellent, with square towers and round into very general use. ones, and various arches, flying buttresses, and other features. Thirty thousand blocks of ice were used in which the enlarging easel was shown, there was exhi- Fah.—Annals of Surgery.

completing the structure, and 200 men were employed in its erection. The total cost has exceeded \$20,000, including approaches and decorations. The interior is divided into spacious halls, chambers, and corridors, with a stairway for reaching the summit of the main tower. In several rooms there are elaborately carved statues cut from huge blocks of ice, and with so much skill that one can only regret that the labor has been expended on such fragile material. Imagine Powers' "Greek Slave" reproduced in rock crystal! Many of product somewhat more solid, they deteriorate the the blocks in the walls are so very clear as to take a rich blue color from the blue sky overhead, while others and more brittle or red short. It has been impossi- on which the rays of the sun directly shine seem like ble to make castings of wrought iron or mild steel at dazzling cut glass. At night the building is lighted by the same time solid and retaining their qualities and electricity, and fine artificial effects are also produced by colored lights and pyrotechnic displays.

The surrounding grounds are decorated with eversteel may be obtained solid without changing the in-green arches, and in other ways. A village of sixty Sioux trinsic quality of the metal, by the addition of the me-: Indians, with their skin tepees and primitive features of tal aluminum either alone or in the shape of an alloy, aboriginal life, is located in one corner of the extensive The aluminum makes the molten metal more liquid, park. Elsewhere there are ponds for skaters and practically unimportant, while the spherical aberrathus the gases in the metal pass easily away, the metal curlers, areas for snow-shoe races, slides for the tobog-tion is also reduced to a minimum.

It might be added, that, along with the ice palace, of metallic aluminum added to the molten iron has an has come a wholesome epidemic for out of door recreations, in which people readily indulge, even though the mercury may fall far below zero. Toboggan slides means for beginners to practice photography, especiing perfect castings from the softest wrought iron, have been constructed at St. Paul and Minneapolis, ally to boys and others who cannot afford expensive some of which are more than 1,500 feet long. More and nature of wrought iron, though their tensile than one hundred snow-shoe clubs have been organized in Minnesota during the past two months, with not less than 4,000 uniformed members.

Since writing the foregoing account, the warm "Chinook" has come, which threatens the speedy demade to the metal when molten, shortly before it is to struction of the ice palace if it should last many days. be poured. The addition may, however, be made It is interesting to note the effect produced on the blocks near the foundation of the massive walls. Of course a great pressure comes upon them, and as they whole fairy-like palace may have dissolved, "like the baseless fabric of a vision;" but as a feature of Northwestern enterprise at play, it is worth describing.

# PHOTOGRAPHIC NOTES.

A New Enlarging Easel.—At a demonstration showing the utility of the permanent bromide paper for enlarging purposes, recently given before the Society of Amateur Photographers in this city, there was exhibited and used a new easel for holding the paper, which Plate and Film Co.

Upon a square frame which rested on the floor were secured two uprights rising four and a half feet; in these were longitudinal slots and grooves. The exposing screen, covered with smooth, hard, white paper, was slid down between the uprights, in the grooves, side, being tacked securely to the staging above. The and held at any desired height by clamping screws cow was thus shut into a room but little more than which passed through the slots to holes in the edge of large enough to contain her with comfort, and comthe exposing screen; to raise or lower the latter it was fortable it was compared to the large open space she only necessary to unscrew the clamping screws. Hing-|had previously occupied. Much might be done in ed to the front of the exposing screen was a black. wooden clamping frame, swinging open like a door, and fortable and more profitable to keep during these ex-

In the door frame could be put kits of smaller size for convenience in securing small sheets. On brackets Building with ice is, of course, in some respects, very at the top of the screen was supported a neat rectang-

To operate the easel, the hinged frame back into the box holding the paper the free end of fine dental plaster into cold water to consistency of heretofore been the usual way of doing it. The easel Place the whole in a vessel containing boiling water and single loose sheets could be easily located in posi-ling water. When the cast is thoroughly dry, it may be by the employment of this easel will doubtless bring it varnish. Casts of any part of the body may be made

bited a 5 x 8 photograph, remarkable for its clearness and depth of focus, made with an ordinary spectacle lens, inclosed in a common wood pill-box for a lens tube, the whole said to cost but twenty-five cents. Every portion of the picture appeared to be perfectly sharp. We have obtained the following particulars: The glass is a common spectacle meniscus (periscopic), having in the rough a clear diameter of 1½ in. and focal length of 18 in.

Generally these glasses are not round, but can be cut by any spectacle maker to fit the metal frame.

In one end of a wood pill-box with the bottom removed was placed the lens with its concave surface outward, and one inch forward in front of this concave surface was the diaphragm,  $\frac{1}{4}$  in. in diameter.

Respecting these lenses, it was said that there was no reason to suppose that for comparatively long focus they should not in a measure supersede many of the cheaper forms of achromatic lenses for amateur work; since they are so extremely thin, the chromatic aberration is

The rapidity of spectacle lenses is also somewhat remarkable. The exposure given to the plate was said to be but three seconds.

The spectacle camera will doubtless present a favorite apparatus.

### Upholstering a Cow Stall.

A neighbor who uses an old horse barn for keeping his one cow, found that when the thermometer indicated from 10 to 20 degrees below zero. his cow stood shivering in her stall, even with an abundance of good food to eat and warm water to drink, and that the quantity of milk given was also reduced below the usual flow. Being ingenious as well as begin to thaw they assume a columnar structure, each merciful, he went to work, with such material as he block seeming to be made up of hundreds of slender could find at hand, to make his animal more comprisms. Possibly before this appears in print, the fortable. The stalls were ten feet high, the stable large, and the outside boarding somewhat loose. In other words, the ventilation was abundantly provided for. To recover the entire building was out of the question, and even were the outside fairly tight, so large a barn with only a single animal in it would still be excessively cold with such a temperature outside. The better way seemed to be to make a small room for the cow, in which her own animal heat would be better retained.

Accordingly, a single horse stall was floored over had been presented to the society by the Eastman Dry with loose boards above the cow, giving just room for the attendant to stand. This floor was then cov-The easel was intended to facilitate the placing of ered with old hay and straw to the scaffold floor above. The sides of the stall were made tight by battens and stuffing, and the front closed up with a door that could be opened for putting in the food at feeding time. At the rear, the supply of boards having been exhausted, old carpets, sacking, etc., were hung in several thicknesses across the stall from sidethis, or other ways, to render farm stock more comcessively cold spells. If stables are tight, and not too large in proportion to the number of animals, their own bodies will warm the air sufficiently for comfort. There is little occasion to worry about ventilation when the temperature gets below zero. The danger,

## Preparation of Paraffine Moulds for Plaster Casts.

BY F. L. TETAMORE, M.D., OF NYACK, N. Y.

Prepare the specimen or preparation, making it as clean as possible; place on oiled paper, in a position Paraffine melted in a water bath is painted over the was opened, preparation with a soft brush, the first layer being put pinning to the screen a large loose sheet, which has face, then fill the mould and let it stand until hard. from a living subject, if the parts are not too sensitive Spectacle Photographs.—At the same meeting at to bear the heat of the paraffine, which is about 150°