PORTABLE FRESCOES.

The process of frescoing in oils, invented by Mr. Charles T. Kemmer, is a novelty in its way, and, we think, is likely to entirely supersede the ordinary mode of frescoing. It is designed to do away with the expense and inconvenience always attendant on the usual processes, and, at the same time, to furnish artistic decorations of a most superior quality and durability.

We may describe the process briefly, as follows: Ordinary sheeting is dipped in soap and water and stretched upon a frame; it is afterward covered with a coating of gelatinous size, and allowed to dry. An oil painting of the nature required is then executed on the prepared sheet, and, after it is thoroughly dried, the gelatinous sizing between it and the sheeting is moistened, and the painting removed, bodily, from the sheeting. The painting is then attached to the plaster by a liquid cement of appropriate character.

In the production of the painting, whether it be merely a plain tint, an ornamental design, or a gilded decoration, about five coats of the best linseed oil fresco paint are used. This produces a tough, tangible film, about the thickness of good writing paper, which will bear washing with soap and water and a sponge as often as may be desired. When cemented to the plaster, it adheres with a tenacity entirely unknown where the paints are laid directly on, as in ordinary frescoes, which are liable to peel off. Cracks occurring in the plaster do not affect the film unless they are of large size.

In the manufacture of this portable fresco, plain tints, etc., are turned out in pieces 20 inches wide and 8 yards long, ready for attachment to the plaster. Where a ceiling or wall is to be covered with a decoration specially designed for the purpose and complete in itself, the painting is executed of the size required, and the film is cut into strips of a convenient size for cementing to the plaster: as the strips are cuttings from one piece, they of course match so accurately that no join is discoverable.

Among the advantages belonging to this process are the facility with which frescoes for distant use may be designed and painted, and the very short time which is necessary to fix them on the walls or ceiling after they are done. As an illustration of the latter, we may state that the film can be applied in one day to a ceiling which it would take three weeks to fresco in oil in the regular manner.

Mr. Kemmer has received patents for his invention both in this country and in Europe. Further information may be obtained by addressing Charles T. Kemmer & Co., Passaic avenue, East Newark, N. J., or at No 4 Warren st, New York.

A Recent Tornado.

Portions of our Western prairie country, by their comparatively level and unobstructed formations, present a fine field for the play of the winds, and for the formation of those remarkable spiral currents known as whirlwinds, from which great damage sometimes results. These spiral currents usually cover a very narrow pathway on the surface of the ground, but they operate with tremendous force, and might not inaptly be termed pneumatic plowshares. One of these aerial giants made its appearance at Quincy, Logan county, Ohio, on the 8th of June.

A sultry day was followed by the appearance of a cloud, in the West at 5 o'clock in the evening, which increased in blackness and size with fearful rapidity. A heavy wind soon set in, and at 5.30 o'clock the whirlwind struck the earth five miles from Quincy, moving in a northwesterly direction. The tornado reached Quincy in about five minutes and passed through the town, making a clean sweep of houses, trees and fences along a path which fortunately was comparatively narrow. In this village 50 or 60 dwellings and stores, two churches, and as many more shops, stables and outbuildings were unroofed, rocked from their foundations and demolished. The air was literally filled with flying weatherboards furniture, laths and plaster. A parlor stove was caught up by the wind and hurled through the air until it fell upon a woman and crushed her so that she died. The Baptist and Methodist Episcopal churches were completely destroyed.

The tornado on its way to De Graff struck Bogg's flouring mill, five stories high, and containing 3,000 bushels of grain. The building was moved nine inches upon its foundation, and the roof and the portion of the fifth story were carried away. The storm plowed its way through De Graff, carrying destruction in its path, but injuring fortunately fewer persons and a smaller number of buildings. After leaving De Graff it passed several settlements, and finally rose from the earth and was seen for miles, carrying in its funnel shaped form timber, rails, and *débris* which it had gathered in its destructive march. The newspapers give the names of some fifty persons killed and wounded by this tornado.

Car Starter.

William M. Stratton and William E. Stratton, of West Troy, N. Y., have recently patented an improvement in apparatus for storing up, in a spring or springs, the power expended in arresting the motion of a car, to be used in setting it in motion again; and it consists in having the drum, which is employed to wind the tension cord of the spring, made with such devices and arranged in such manner that it may be locked and held after being detached from the gearing connected with the axle to wind it up, so that the car may be allowed to run awhile before the power of the spring is applied; thus making the apparatus capable of retaining the power stored up in the spring while the car is going down a descending grade and using it on an ascending grade, the car running free between the grades. The invention also consists in certain novel devices, for thus detaching, holding, and locking the winding drum.

CINCINNATI EXPOSITION.

The commissioners announce in our advertising columns that the third National Industrial Exposition will be opened in Cincinnati, September 4th, next. It will remain open until October 5th, following.

The aid which such exhibitions afford to business and the advancement of knowledge is of the most important character, and fully entitles them to the interest of tho whole nation.

We would wish to remind intended exhibitors that they are recommended to make immediate applications for space.

Extensive arrangements have been made for the transportation of visitors, at reduced fare, and it is expected that the large attendance of last year will be very much increased this season.

THE UNIT MEASURE OF ELECTRICAL RESISTANCE.

Since the electric telegraph has been in existence, quite a number of different units of electrical resistance have been proposed, but at the present time nearly all of these units have been adjusted to one standard, so that one of them may now be considered the basis of all.

Professor Wheatstone proposed, as a unit, one foot of copper wire weighing one hundred grains.

Professor Jacobi proposed a copper wire one meter long and one millimeter in diameter.

Professor Matthiesen proposed a copper wire one statute mile in length and one sixteenth of an inch in diameter.

Mr. G. F. Varley's unit is a mile of special copper wire one sixteenth of an inch in diameter.

Dr. Werner Siemens employed a glass tube filled with pure mercury. This tube was one meter in length and contained a column of mercury having a transverse section of one square millimeter.

The German, French, and Swiss telegraphers used a certain length of their standard sized iron wire, such as was used for the construction of overland telegraph lines, as a practical unit of measurement.

The British Association proposed and adopted a theoretical unit of resistance, in which a certain amount of work or mechanical effect is produced by a given amount of electricity in a given length of time, and this theoretical resistance is copied or represented by a certain length of wire.

This unit is beautiful in theory, but difficult and uncertain in practice. The principal source of difficulty lies in the accurate measurement of the mechanical effect of the electric current. Since this unit has been adopted by the British Association, some of the most expert continental physicists have, by experiment, arrived at the conclusion that it is about two per cent smaller than the copies distributed by the association.

The objection to the employment of copper wire of various sizes as a standard arises from the fact that no two specimens of copper, or of any other metal, possess precisely the same specific conducting power, and, therefore, measures of resistance thus defined are liable to vary, and, in fact, do differ from each other very materially.

This objection, however, says the *Telegrapher*, does not apply to mercury, which, in consequence of its fluid nature, is easily rendered chemically pure. In fact, experience has shown that resistances can be produced and reproduced by means of mercury, which do not vary among themselves more than two or three ten thousandths of a unit, or about as near as the finest set of silversmith's scales can be made to balance and weigh alike.

In deciding upon a standard of measurement, the first and most important consideration is to select one which is least likely to undergo change or variation, so that, when they become multiplied and brought into general use, one of them will always correctly represent another.

If we suppose, for example, that a person should undertake to construct a two foot rule: He first selects a standard as nearly correct as possible, and copies it with great care. Suppose he then destroys the first and makes a third from the second, and a fourth from the third, and so on until he has made a thousand, and all of his measures, except the last one made, have been destroyed.

Now, we will suppose that another person commenced making two foot rules in the same manner, and using the same original standard to copy his measures from, and in the same way copied one from another to the number of a thousand. If these two persons compared their final measures with each other, it is more than probable there would be a considerable difference—that is, they would not agree one with the other. In view of this disagreement, how could it be decided which was the most correct, as the original standard is no longer in existence? In some such condition would two persons be, each having British Association units of measurement. They cannot get at the original unit, because it never had a practical existence.

The mercury unit, on the other hand, has for its basis the meter measure, which is defined as the ten millionth part of the distance of the pole of the earth from its equator, and very nearly the length of a pendulum that beats seconds.

The British Association unit forms part of a system. The resistance bears the same relation to the other conditions that distance does in the definition of a horse power. A horse power is that force which will raise 33,000 pounds one foot in one minute. Similarly, a British Association unit is the resistance of the circuit producing a defined mechanical effect or work in a certain time, with the other conditions of quantity and intensity defined as units. As before stated, the great difficulty lies in the correct measurement of this mechanical effect. In order to accomplish this, the British Association made use of a magnetic needle, that is, a magnet held in its position by the magnetism of the earth, which is never in itself constant, and is at all times in a state of perturbation. It results from this that the force required to move this magnet equally, at different times, will not be the same. In addition to this, the magnet is affected by local causes, and in no two different localities can it be said to be affected precisely alike. From these and other reasons, German scientists of the highest rank, as the result of their investigations, have announced that the British Association unit, as distributed by their committee, does not approximate its true value within nearly two per cent.

It was after careful consideration of the defects in the different standards of electrical resistance, and with the desire to adopt the one which was least liable to objection, that the International Convention of Electricians, at Vienna in 1868, adopted the mercury unit as a standard, and all the European countries, with the exception of Great Britain, have adjusted their resistance scales to it. Mr. Varley has defined his unit, or "readjusted it to 25 mercury units."

Mr. Latimer Clark defines the B. A. unit, or Ohm, as "the resistance of a prism of pure mercury one square millimeter in section and 1·0486 meters in length at 0° centigrade," so that, in reality, the mercury unit is now the basis or standard of all the measures in use.

The average resistance of a statute mile of good No. 9 galvanized wire, such as is generally used in this country, is about 20 mercury units.

Masonry and Brickwork.

However gigantic may be the strides with which engineering science has advanced during the last few years, it cannot be denied that, so far as regards the special art of building in masonry or brickwork, the present race of architects and engineers are feeble in conception, timid in execution, and but dwarfs of utter insignificance as compared with the giants of former days.

It would be amusing, or more truly perhaps the reverse, to note in what manner an average architect or engineer of the present age would deal with some of the problems presented to the old masters: for instance, such a one as that successfully solved by the Saracenic builder of the justly celebrated tomb of Mahomet at Beejapore, India, which was as follows: Given a building 135 feet square on plan, and 110 feet high, required to cover the same with a circular dome 124 feet in diameter, and weighing some twelve or fourteen thousand tuns. It would be curious to observe how many hundreds of tuns of iron our men would consider it imperative to throw into the work. The Saracen, knowing the capabilities of his material, asked for no ironwork, but fearlessly trusted to his masonry, and skillfully corbelled out the square walls at the top to meet and support the circular dome, and to such a bold extent that, at the angles of the building, the projection of the corbelling measured no less than 46 feet.

How infantile appear the greatest exertions of our modern building in comparison with such mammoth works as these. The traditions of the art have been lost, and science has provided no substitute. Our professors, if they do not avoid the subject altogether, treat it in a perfunctory, *ignotum per ignotius*, manner, which only serves to make the "darkness more visible," or the "little glooming light"—which may already exist in the student's mind—"more like a shade." We may be taught, for instance, that the line of pressure in an arch must be included in the middle third of its depth, or the arch will tumble down, and we may be treated to many other equally shallow *dicta* based upon hypotheses evolved from purely theoretical considerations, which the bare existence of hundreds of buildings for hundreds of years conclusively demonstrates to be utterly false and untenable.

In recent times, no doubt, the introduction of iron work has had much to do with the extinction or suppression of nearly all that is true and expressive in the art of building. It is so very easy to multiply the span and divide by the depth, and to perform the other elementary operations incidental to the determination of the strength of an iron girder; and then, besides, the figures and diagrams look so clever as to induce, in the too often shallow performer, a glow of self complacency, leading him to fervently believe that an engineering feat has really been achieved. But if such work constituted engineering, the schoolmaster in the "Deserted Village" would be an admirable exponent of the science:

> The village all confessed how much he knew;
> 'Twas certain he could write, and cipher too.

Another advantage offered by ironwork as compared with masonry, and one to indolent or incompetent men peculiarly seductive—is that of shirking responsibility. With iron girders, the designer may devote the few minutes necessary to the conventional calculations, specify iron of a given strength, and so rid himself lightly of any further sense of being responsible. But if, on the other hand, his first consideration is his client's interest, and not his own ease, he will often be led to discard ironwork in favor of masonry, and he will find no royal road to learning in that direction, but must honestly and laboriously qualify himself, by theoretical and practical investigation and by comprehensive analyses of works already executed, to form a correct estimate of the capabilities of the masonry or brickwork with which he may dealing, and to shape his design accordingly.—*Engineering.*

OZONE IN THE AGEING OF ALCOHOLIC DRINKS.—On running out wine drop by drop through a vessel filled with ozone, the essential oils and other substances which give the wine a "new" flavor are destroyed, and the wine much improved in quality.—*M. Loew.*

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