"Kelly," &c. All of the United States buildings having elevators, and in short, nearly all the most valuable public buildings, hotels, fashionable stores, apartment houses, &c., to the number of thousands, in this and other American cities, contain specimens of hydraulic or steam elevators of the same admirable manufacture.

The new hydraulic elevator is indeed a prodigy of simplicity and automatic power, with simple gravitation of air and water for its only law and mode of action, and with a conspicuous absence of the objections heretofore observed, as well as of all others conceivable. It consists of an upright cylinder and piston, only about a foot in diameter, and half the height of the lift; two pipes and two valves. That is all, save the car with its hoist ropes and sheaves, and whatever means, natural or other, may be used to bring a head of water into connection with the cylinder. One of the two pipes is a circulating pipe which connects the two extremities of the cylinder, and affords a passage for the transfer of water from one end to the other—that is, from above the piston to below it. It is also the medium for the pressure of water from the other or hydraulic pipe; a pressure thus made at all times continuous and uniform on the top of the piston head, wherever it may be, in motion or at rest. This pressure (when not neutralized) forces down the piston, thereby drawing up the car by the hoist rope attached to the piston rod.

Let us first suppose the car at the top of the lift, and the piston consequently down at the bottom of the cylinder; or, the car stationary at any point in the lift, and the piston at a corresponding point in the cylinder. As the cylinder is always full of water, and the full head of pressure always on, wherever the piston may be, the only possible way for the piston to move in either direction is for the water to get out of its way through some outlet. To let the piston rise (pulled up by the weight in the descending car) it is only necessary to open a valve that closes the lower end of the circulating pipe, thus opening communication from the part of the cylinder above the piston to the part of the cylinder below it. This allows the water above the piston to be pressed out before it, and down and back into the cylinder under it. The steadiness and ease with which the piston follows up the receding water—which, in turn, follows it up as steadily beneath—can not be exceeded by any movement in art or nature. At the same time, the movement is graduated perfectly to the will of the operator, whatever the variation of load, by opening or contracting, more or less, the valve orifice through which water is transferred from the top to the bottom of the cylinder. No water is expended.

Finally, to force down the piston and hoist the car, the circulating valve before mentioned must, of course, be closed; but this only renders motion either way impossible, because an immoveable body of water without vent fills the cylinder both above and below the piston, and it might as well be solid iron, for the matter of allowing the piston to stir. Another of the simplest things in the world must be done, namely, to open a discharge valve from the lower part of the cylinder, when the water there, in flowing out, begins not only to make room for the descent of the piston, but to make a vacuum beneath it which brings the atmospheric pressure upon the top of the piston, in addition to the pressure of the hydraulic column, which is never withdrawn. The descent is the same perfectly balanced, steady, soft and *fluid* motion previously noticed in the ascent; graduated likewise to perfection by controlling the size of the orifice with the valve rope in the hands of the operator in the car. The symplicity of the valve motion is also very beautiful. The two valves are simply two plugs a few inches apart on one stem, fitted inside a pipe, and drawn up or down by an easy motion of the hand rope. They are so adjusted with the orifices of circulation and discharge, respectively, that while they are at an intermediate position, all motion of water, and consequently of piston and car, is blocked; if lifted, they gradually and simultaneously open the discharge and close the circulation orifice, as much or little as the operator pleases, causing and graduating descent of piston and ascent of car; or if lowered, they cut off dicharge absolutely, and open circulation as gradually as desired, causing ascent of piston and descent of car.

The multiplication of the piston motion two or three fold in that of the car (which is all that can be necessary in the highest buildings with these long-cylinder machines) is done by single pairs of sheaves, and consequently without making the ropes cross the plane of revolution of their sheaves, and therefore without special friction, as well as without special strain and wear. All moves easily, naturally, straightforwardly, imperturbably, like the silent music of the spheres. The power, unlike that of steam, is as definitely limited and as invariable under all circumstances as the weight of so many cubic feet of water, with which the entire motive apparatus is exactly filled at every moment, never a drop less or a drop more, or the space of a drop vacant. The chances of breaking anything are reduced to a minimum so remote as to be hardly more than metaphysical; and yet all the standard safety appliances stand on guard against that conceptual possibility, so that there is probably no other kind of vehicle or mode of motion on sea or land so safe as that of the new hydraulic elevators above described. It is estimated that thirty millions of passengers are now annually conveyed to and from the upper stories of buildings in the elevators recorded on the salesbooks of Otis Brothers & Co. Up to the present time, this inconceivable amount of passenger business has been performed without a single reported instance of injury to life or limb from the failure of any part of the machinery. The fact is, so far as we know, without a parallel in the history of machinery, and may well direct earnest attention not only to the general qualities, but to the special features, of these remarkable machines.

OXIDIZED OIL.

To welcome a new industry is always an agreeable task, but special interest is attached to those instances in which the application of scientific principles have contributed to the results.

We have now to record a few facts relating to a means of manipulating oils, which result in the formation of a substance which has many of the advantages and characteristics of Rubber, but which can be manufactured at a fraction of its cost.

Reduced cost in the manufacture of a staple article, where a monopoly can be secured, naturally suggests great profits, and as capitalists are now competing for the privilege of manufacturing this new material, a few words respecting its nature and properties may be acceptable to our readers.

A few years ago a man of studious habits and inventive genius noticed that around the mouth of a can of oil, the oil had acquired the property of solidity, and finding that the effect was due to the oxidation of the oil, he conceived the idea of turning this property of linseed oil to practical account for various purposes in the Arts and Manufactures.

Mr. Frederick Walton, (for that was the name of the gentleman to whom we have referred) occupied several years in studying this subject, and making practical experiments relating to the behavior of oils under various conditions, and at length arrived at such successful results as to warrant his reading a paper before the London "Society of Arts," entitled "Introduction and Use of Elastic Gums and Analogous Substances." In this paper, after discussing the sources and qualities of india-rubber and gutta-percha, he described a method which he had invented of manufacturing an artificial product, which not only possessed the principal qualities of Caoutchouc and

of the gum of the Para tree, but which was considerably cheaper and had a wider application. The principal feature in the new process was the oxidation and consequent solidification of linseed oil. He found that linseed, nut, and poppy oil possessed the property of becoming concrete on exposure to the atmosphere, and that when spread in a thin layer, on a surface of wood or iron, they dried or changed into a thin skin.

This change is of course produced by the absorption of oxygen and the disengagement of carbonic acid. The power of absorbing oxygen rapidly is inconsiderable in the crude or raw linseed oil, but is greatly increased by boiling the oil, which is best effected by exposing a large quantity of raw oil to a strong heat in a cauldron, with a small percentage of metallic oxide of lead. In this condition it is called varnish, and has a viscid character. A layer of this oil requires from six to twenty-four hours to change into a skin-like substance, according as the state of the atmosphere is more or less favorable.

One of the first materials placed upon the market by Mr. Walton as the practical result of his experiments was a new floor cloth which he called Linoleum. This material has for its basis oxidized oil, which is mixed with a tenacious substance, to which is added finely powdered cork. The material thus formed is passed between rollers and pressed upon a fibrous texture.

The advantages of Linoleum over the previous oil cloths was apparent, for it was waterproof, a non-conductor of heat, while its natural body color permitted the addition of an agreable and artistic decoration. The manufacture of Linoleum has been a great success, and has realized large fortunes to its original promoters, and fifteen years after its introduction was still paying 60 per cent as a dividend.

Linoleum may described as the first and crude result of Mr. Walton's expensive experiments with oxidized oil; he had however in reserve a higher development of his ideas, and at length produced a material which is a refinement of all his previous efforts.

Lincrusta-Walton, as its name implies is made from oxidized linseed oil which is skillfully manipulated with various substances, forming a material posessing most valuable properties and its principal characteristics appear to be unique.

Unlike Linoleum, which is adapted to one purpose alone, the application of Lincrusta to the Arts and Manufactures is most varied, and we shall soon find it in every house under so many forms that its future as a staple commodity is assured. One of the most valuable properties of Lincrusta lies in the fact that although originally so soft as to receive the most delicate impressions, it hardens within a few hours and permanently remains in that condition. It is a waterproof material with a natural color of a neutral shade, which can be changed in manufacturing to almost any tint. Lastly the manufacturer, by manipulating the cement, has it in his power to produce many modifications of the material, and, as we shall presently show, can make various substances which have a very wide application, and which will undoubtedly supersede many valuable monopolies, on account of its being both cheaper, more permanent, and possessing many advantages over its rivals.

Perhaps one of the most important adaptations of Lincrusta is a new and improved covering to walls, and as such it appears to us a perfect decoration. For this purpose the Lincrusta is passed through machines which leave an elegant design *in relief* upon its upper surface, and at the same time is pressed upon a thin backing of muslin or paper. Thus manufactured and hung as a wall paper in its natural tint, it is the most beautiful mural decoration known, and when colored or hand-painted the most varied effects are produced; it may present the appearance of a rich old tapestry, or the subdued tones of stamped leather. Combined with the gilder's art the brilliant effects of embossed metal in solid relief are obtained. The only limit to its development in this respect is the art of the designer and the skill of the die sinker. Bearing in mind that combined with these advantages we have a material as flexible as leather or even rubber; resilient, standing blows without injury, enduring and tough, not easily torn, waterproof and unaffected by temperature, and withal capable of being produced at a price below even the medium quality of relief papers, and it is clear advantages are combined in Lincrusta that will make it one of the most valuable products which can be manufactured, and one which will be of universal use.

The special use of Lincrusta in the United States as a wall decoration will be at once recognized, as its warmth and resistance to damp makes its application almost imperative in the case of frame buildings which form the majority of dwellings in this country.

Of the other applications of Lincrusta to the Arts and Manufactures, our reference must be brief, for they appear endless in their variety. Among other purposes Lincrusta can be used as an excellent covering for external walls. For bookbinding it takes the place of carton-pierre and papier-mâchè, and even excels leather in its capability of receiving fine and incisive ornament. Mouldings of Lincrusta can be gilded with facility, and attain a hardness equal to wood, and can be applied in this form to picture frames, cornices, panels, mantelpieces, or any kind of furniture.

For wall advertisement-placards Lincrusta has many advantages, the letters are in relief, and neither sun, rain or damp has any bad effect upon it.

Railway and other traveling cars will in future be decorated with Lincrusta, and its application in steam ships is acknowledged, having been largely used in the new Cunard ship *Servia*, which recently left our port. In this instance the builders state that it gave the greatest satisfaction both to the owners and to those who inspected the ship.

Lincrusta-Walton may be applied to many other purposes than those already enumerated, but the above are amongst the most important and offer an almost unlimited field for manufacturing and commercial enterprise. In short, all decorations executed up to the present time on *flat* surfaces, that is to say *without* relief, can now when desired be fashioned *with* relief, and their artistic value and appearance may thus be considerably augmented.

Among the art exbibits now to be seen in New York, that of the Lincrusta at 41 Union Square, corner of 17th street, is perhaps the most attractive. Specimens of the material have been imported from London and Paris and are here shown *in situ* and have elicited the admiration of all who have visited the rooms. The material is not yet for sale, and the exhibit has been made merely to show the public the wonderful effects of this beautiful material, by Mr. John R. Whitley, a gentlemen who has largely interested himself in this matter, and who is now making arrangements to give the American public the benefit of this manufacture.

If our description has aroused an interest in this subject, we would simply state that the exhibit is open to all who desire to verify the facts here stated and that those who desire information which is not given in this description, will there find there ample means of learning the fullest details.

PROFESSOR WILLIAM O. CROSBY has published an excellent little manual on "COMMON MINERALS AND ROCKS," which is sold by Messrs. Ginn, Heath & Co., of Boston, at 35 cents. A complete set of minerals and rocks named in the work can be had of Professor Crosby for $1, or a more extended set of larger size, including 75 specimens, for $3. With both sets 25 cents is charged for packing.