only chairs, at least one of which is now deemed indispensable to every well regulated furniture store, and the quantities of abnormally written documents attributed to the Father of his Country which photography reproduces in uncounted and genuine originals, our credulity gives way, and we warn our readers against Centennial relics. During the past winter, we have seen certainly thirty quilted petticoats which fair wearers assured us belonged to Martha Washington, and this is in only one city. How many such garments Philadelphia possesses, we cannot divine. All along Broadway, conscienceless small boys are vending musty, yellow, and ragged newspapers; and not a single anniversary of any revolutionary battle can occur but that copies of the particular ancient paper containing the account of the conflict are sold in New York, in editions so large that the long since dead publishers would have deemed their fortunes secure had their original publications achieved one half the circulation. Lafayette buttons are appearing by the gross; and as for Franklin's canes, their name is legion. There is a strong and growing desire for these things, which bids fair to establish a new and patriotic industry devoted to their manufacture

THE DI CESNOLA COLLECTION.

LECTURE DELIVERED AT THE STEVENS INSTITUTE OF TECHNOLOGY, BY WM. HENRY GOODYEAR, ESQ., OF NEW YORK.

"Westward the star of empire takes its course" has always been a fundamental truth with regard to the progress of civilization; and although at the present day the troops of the Czar steadily pursue their march eastward, all our modern nations owe their being and development to a steady movement in the opposite direction. Our ancestors lived in the mountains of Hindostan and called themselves the Aryans; and when they started out upon their migrations westward and settled in Europe, they became in time Greeks, Romans, Germans, Celts, Slavonians: all of whom belong to the same great family, to which the name of Indo-European or Indo-Germanic has been given. We know the fact of their kinship by the similarity of their languages as revealed by comparative philology. Take a single example: Mother in Sanscrit is *mâtár*, in Persian *mâder*, in Greek *μητηρ* in Latin *mater*, in Celtic *mathair*, in Slavic *matka*, in Swedish and Danish *moder*, in German *mütter*, in Dutch *möder*, in Anglo-Saxon *moder*. If such then are the ties which connect us with the ancient world, the study of its civilization proceeds from higher motives than mere curiosity; it is the study of our own first beginnings.

The subject of the present lecture is the development of art, as illustrated by the Di Cesnola (pronounced *Chessnola*) collection in the Metropolitan Museum of Art at No. 128 West 14th street, New York.

General Louis Palma di Cesnola, an Italian by birth, but an American citizen, who fought in our civil war, was appointed Consul to Cyprus in 1865 by the American government. Cyprus is one of the largest islands of the Mediterranean Sea; it is situated near the Syrian coast and belongs to Turkey. Owing to its position, it is a convenient point for the representatives of the European powers to keep watch on each other's movements with regard to the Eastern question. Although the whole island contains less than one hundred and fifty thousand inhabitants, there were then as many as seventeen consuls on it, whose whole business was to bully each other and act as spies for their governments. Di Cesnola, whose government was not involved in the Eastern question, perceived the importance by reason of its lying directly in the route of ancient civilizations, and proved himself the only sensible consul on the island; for he commenced to dig.

The importance of the objects he exhumed soon attracted the attention of archæologists; and in 1869, when the lecturer was on the island, with an agent of the Berlin museum, he witnessed the sale of everything that had been brought to light up to that time. But Di Cesnola continued his excavations after that; and in the winter of 1869 to 1870, he began work on the site of the ancient city of Golgos, discovered the Temple of Venus, and brought to light the most important collection of statuary yet found.

The way in which the city of New York came to secure so great a prize was as follows. It was first offered to Boston, and then transferred to London with a view to its acquisition by the British Museum. But Mr. Newton, the head of that institution, was unwilling to accept it under the conditions of the sale: namely, that it should retain the name of Di Cesnola, and that it should be kept intact. As there was a mortgage on the collection, Mr. Newton expected to obtain it on his own terms by delaying his decision until the day of the sale; but he was baffled in this by Di Cesnola, who grew tired of the whole business, and sold the collection to Mr. John Taylor Johnson, of New York, for $40,000.

The two principal features of the collection are its ugliness and the confusion it is likely to leave in the mind of the spectator. This confusion will disappear when we study the position and history of Cyprus with a view to what we may expect to find there.

The island of Cyprus is only 150 miles distant from the Euphrates, that is to say, from the great Assyrian empire of Babylon and Nineveh. The nearest neighbors were the Phœnicians of Tyre, a great commercial nation, who had sailed as far as Britain, B.C. 1300. They first colonized Cyprus as far back as B. C. 1800 or 2000. Then the island passed successively under the dominion of the Egyptians, the Assyrians, the Persians, the Greeks and the Romans. As we do not know of any Phœnician art, the first to occupy our attention is the Egyptian. The characteristics of Egyptian art are evident in the temple of Ipsamboul. There we see the sculpture as an auxiliary of architecture. The statues are not free, but attached to the walls. The artists seem also controlled by the principle that their work should adapt itself to the material of which it is made, in other words, that a stone statue should be stony. Lastly, their sculpture, like all art, reflects the spirit of the people. The great characteristic of the Egyptian people was their sentiment of eternity. All their works show its imprint, either by their colossal nature or by other attempts at conferring durability. We notice it in the pyramids, the tombs of their kings, in the embalming of mummies, and in their statuary. Here everything is of a fixed type, from which the individual artist may not vary. Hence we find, in all Egyptian statues, the same monotonous expression, the same conventional breadth of shoulder, the same head dress. A statue from Cyprus, which exhibits the above characteristics, is consequently pronounced Egyptian. Its date would therefore be between B. C. 1440 and the end of the twelfth century B. C., the period of Egyptian ascendency in Cyprus.

We next find Cyprus as a part of the great Assyrian empire, and the sculpture of that period may be expected to exhibit Assyrian peculiarities. What these are appears in a representation of the winged bulls of Nineveh, taken from the Assyrian Court in the Crystal Palace, London. In the Assyrian empire, where mind was held in as much esteem as force, we find curious combinations of human and animal figures, made still more subservient to architecture than the Egyptian; for they are all in relief. There are no free figures. The Assyrian statues found at Cyprus are all distinguished by their helmets, their beards, and the peculiar simple drapery.

When Nebuchadnezzar destroyed Tyre, in 571 B. C., he crippled the power of the Phœnicians in Cyprus as elsewhere, and gave the Greeks a chance to gain a firm foothold on the island. With their increasing influence, the art of the Greeks began to flourish. There is a fine specimen of it which is easily recognized to be a statue of Hercules by the knotted club and the lion's skin. The head of the lion forms the head dress of the statue. The teeth and upper jaw form a kind of crown on its forehead, and the lower jaw is divided into two parts, one over each cheek. The face resembles that of the native Cypriote type of the present day, and leads us to conclude that its sculptor was a Cypriote. This statue is one of the most valuable of the collection, and would bring about ten thousand dollars.

The next period in the history of Cyprus is again one of Egyptian ascendency; and the statues of this time, although still Assyrian, show the influence of Egyptian art. One specimen exhibits the Assyrian helmet, beard, and drapery, but also the conventional breadth of shoulder peculiar to the Egyptian statues.

After this the faces and drapery of the statues become more and more Grecian. In one figure the high priest of Venus, holding in his hand the dove sacred to the goddess and a patera or cup for libations, exhibits the peculiar zigzag character of Greek drapery. Originally they first carved their statues in wood, and then dressed them up. The angular nature which their first crude attempts had was afterwards copied in stone and became consecrated by usage. Observe the Assyrian helmet and beard and the Cypriote type of face. It is a curious and instructive fact that all these varieties of statues were found together in the same temple; for it shows us the gradual development of Greek art from Eastern art. One specimen is the most perfect example of Greek art in the collection; and it is not forty years removed from the date of the finest specimens of sculpture Greece has ever produced. The statue of the Discus Thrower shows indeed a giant step in advance; but it was very long before the development was reached. For five hundred years the Greeks were, like ourselves, too busy making money to have any art of their own. When we, in our brown stone fronts, etc., imitate some of the least desirable features of ancient art, and thus expose ourselves to criticism, we may point to the Greeks as imitators before us. The discus thrower just referred to dates not 150 years after the statue of Hercules.

After the Persian wars, when Cyrus had taken Babylon, and Cambyses conquered Egypt, the Phœnicians, who were the allies of the Persians, again flourished in Cyprus. Then the faces of the statues assume the semitic type, but otherwise preserve Greek characteristics. A figure in which the drapery is very carefully executed shows the peculiar ribbed woolen undergarment, peculiar to later Greek statues.

To prove that the statues shown were not the representatives of merely provincial but of true Greek art at different periods, the lecturer threw upon the screen a picture of statues from the Acropolis at Athens, and pointed out the same characteristics in them.

After the conquests of Alexander, Greek art rapidly declined, and we find portraits instead of ideal faces and figures. The Greeks were spread over too large a territory and formed too small a fraction of its inhabitants to maintain the ascendency of their taste. They were diluted too much by the barbarians. The same cause operated unfavorably to the development of Roman art. There was not enough Roman blood in their vast empire to produce anything truly national.

The temple in which so many valuable objects were found was 60 feet long and 30 feet wide. It was built of mud bricks, 5 feet high and 2 feet thick, dried in the sun, and had a wooden roof. In the course of time the bricks crumbled, the roof rotted away, the space between the statues was filled up, and other *débris* accumulated above it.

C. F. K.

LINING metal for axle boxes: Tin 24 parts, copper 4, antimony 8. Melt together, and add 24 parts more tin.

Trombes.

A good deal of attention has of late been given by meteorologists to the whirling atmospheric movements denominated *trombes*. That these *trombes* are of electrical origin has been suspected from the very beginning of electrical science, and in last century experiments were made by way of imitating them on a small scale. Between two metallic plates, the upper of which was electrified, while the lower was connected to earth, various easily movable substances were brought. Water was raised in form of a cone; bran was lifted so as to form a pillar, than scattered in a whirl. In such experiments, however, the phenomenon can only be observed momentarily; the cone or column, if indeed produced, immediately disappears through the scattering of its component particles.

In a recent communication to the Berlin Academy, M. Holtz has described an apparatus by which this interesting phenomenon can be produced with greater certainty, and observed for any length of time. The arrangement consists of a cylindrical glass vessel about 8 inches high, 6 inches wide, and $\frac{1}{12}$ or $\frac{1}{8}$ inch thickness of side. It has a perforation in the middle of the bottom; this is filled with tinfoil, and closed on both sides (above and below) with two large plates of tinfoil. In the middle of the glass vessel hangs a hollow, flat-pressed, metallic ball, $\frac{4}{5}$ inch in thickness, and 4 inches in diameter. The suspending piece consists of two metallic tubes, one movable in the other; the upper one is connected with the conductor of an electric machine.

If now various easily movable substances, pulvervulent, and not very good conductors, be introduced into the vessel—so much of them as will be sufficient to cover the inner plate of tinfoil $\frac{1}{6}$ to $\frac{1}{5}$ inch—then, as soon as the machine is put into action, and the second conductor connected to earth, the substances are thrown into violent motion between the two opposite electric surfaces. With sand, however, or similar materials, no determinate cone or column formation is distinguishable. But with substances of better conduction and coarser structure, such as bran or sawdust, there are constantly formed, through the deposition of new portions, large cones and perfect columns, from which, however, the stormy, whirling, and progressive motion is absent.

M. Holz obtained a phenomenon much more similar to the natural *trombes* when he used a liquid instead of powder—especially turpentine or olive oil—and gave the lower electrode a pointed form by adding a column of wood, this substance being taken to avoid the passing of sparks. The vessel was filled with liquid up to $\frac{4}{5}$ inch above the point, and the interval between the metallic disk and the liquid was regulated according to the tension of the electricity.

"If we now bring the machine into action," says M. Holtz, "we observe, first, at the surface of the liquid a slight curling, and presently it tends to rise up the sides of the vessel in a peculiar vibratory motion. Very soon there is a stronger undulation, and a middle cone is formed, which gradually increases; and so long as it does not reach the metallic body, it flies off in minute dancing droplets. If, on the other hand, the cone has become a column, the liquid moves from the middle of the metallic surface to the border, and there falls down at several parts in the form of thinner columns, which, differently from the middle one, have their large bases above. Often, too, the rising stream parts into several of similar form, each of which follows its own path towards the middle part of the disk, and thence toward the edge, where, again, it branches into several descending streams. The liquid also frequently arises simultaneously at various parts, so that, sometimes, reckoning the downward streams, one may count more than twenty distinct columns; and all these columns are in constantly progressive and whirling motion."

M. Holtz calls attention to the circumstance that, in the formation in question, no difference was observable between negative and positive electricity; only the motion was more violent when the metallic disk was negatively electrified.

That the agreement between the artificial and the natural *trombe* is not absolute is, of course, evident from the circumstance that in the one case we have a closed space, with walls probably not without electric tension, as against unbounded space in Nature; and the formation occurs in Nature between movable surfaces, whereas in the experiment it is between fixed surfaces.

New York Academy of Sciences.

At a meeting of the New York Academy of Sciences, recently held at 64 Madison avenue, a section of biology was organized. This section will meet on the first Monday evening of each month, and to it will be referred all papers on zoölogy, botany, entomology, ethnology, anthropology, and kindred subjects. Professor E. H. Day, of the New York Normal College, was elected chairman of this section, and Dr. Heinzmann secretary. It is proposed to form field parties and make frequent excursions to the suburbs, as soon as the season permits of botanizing and fly catching. As the meetings of the Academy are public, those of our readers who are interested in plants and insects will do well to attend, bringing with them any curiosities they may chance to find.

Improved Zinc White.

According to a recent report of the Austrian Chemical Society, M. Orr produces a very beautiful zinc white by the following process: Sulphuret of raw barium is washed, and the liquid obtained is mixed with equal quantities of chloride and sulphate of zinc. The precipitate is collected, pressed, and dried. It is then heated on a hearth, and, while hot, is thrown in cold water. This last treatment produces a mass of great density, and the material, after washing and grinding, is of great purity and whiteness.

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A Locomotive for Working Steep Gradients.

An English engineer, Mr. Andrew Handyside, has recently patented in England and this and several other countries a locomotive engine for drawing trains up inclines. A trial was recently made with one of these engines at Bristol, England, and the result was such as to show that the invention is one of some merit.

The engine weighed 13 tuns, and to it were attached two trucks weighing together 25 tuns 14 cwt.; and one portion of the line on which the trial was made was on an incline of 1 in 12. The peculiarity of the system is that the engine is coupled to the train by a steel chain or wire rope, wound round a drum mounted in the framing of the engine. The axis of this drum works horizontally in bearings fixed in the main framing of the engine, and it is rotated by gearing from a separate pair of cylinders, distinct from the usual cylinders which drive the locomotive. A drum, 2 feet in width and 1 foot in diameter, will accommodate chain enough to fulfil all the requirements of the system. On each side of the engine framing, and on each side of one or more carriages or wagons of the trains, there are suspended one or more self-acting gripping struts, which, when let down on the rails by the driver or other person in charge of the train, will firmly grip the sides of the rails, and hold the engine or train stationary. On arriving at the foot of the incline, the engineer releases the hauling drum, and, without stopping the engine, runs up the gradient to the required distance. The struts are then let down on the rails; and by grasping the rails, they render the engine stationary, and the load is drawn up to the engine much after the fashion that loads are drawn up inclines at collieries. The last truck of the trial train was furnished with an automatic gripping strut, which, when the trucks commenced a retrograde movement, at once grasped the rails on each side, and held the train in its place beyond the possibility of its being moved, our informant states, even when the engine with full steam on was backed against it.

The experiments were of the most thorough description, and the invention was tested in every way. In the first place, the value of the gripping strut was shown. The powerful little engine mounted the gradient without its load, and, full steam on, ran the whole length of the siding. At a signal from Mr. Handyside, the brakes were applied, and the engine was brought to a standstill in the length of a rail and a half. The contrast between the power of this brake and the ordinary hand brake, with which the engine was also supplied, was fully shown. The wagons were then attached, and the brakes on the engine and on the brake van were applied simultaneously with equally satisfactory results. This experiment was witnessed with very considerable interest, as the brake question is just now occupying very much of the attention of railway men. With the continuous brake, it was pointed out that, 90 per cent of the wheels being braked, a train is pulled up in about 900 feet with the train going at a speed of fifty miles per hour. In this case, the train pulled up in 600 feet, and only 75 per cent of the carriages were braked. After duly testing the brake, the method of mounting steep gradients was shown. The engine put full steam on, ran to the foot of the incline, and then, letting out the steel wire rope which coupled it to the trucks, mounted the steep alone. The gripping struts were then let down; and the engine having thus been made stationary, the trucks were hauled up to it, the automatic gripping strut coming into action, and the whole train remaining stationary. The accomplishment of this test occupied a surprisingly short time. The trucks were then lowered to show the control which the driver was able to exercise over a train for lowering purposes. The company claim that, by this invention, smaller and less powerful engines may be used on heavy gradients, and that it will allow of less cost in constructing lines, inasmuch as less cutting will be required.

Detection of Adulteration in Wine by Means of Absorption Spectra.

Professor H. Vogel states that the simplest method of detecting adulteration in wine, especially in regard to the coloring matter, is by means of the spectroscope. The apparatus required is as inexpensive as the operations are simple. Professor Vogel employed for the purpose a pocket spectroscope which cost in Berlin 36 mark (about $9.00). The instrument is first directed towards the blue sky, or to its reflection in a mirror, clamped in a horizontal position in a retort holder, and the slit closed until the principal Fraunhofer lines, C, D, E, F, G, and a few intermediate lines are distinct. The liquids to be studied are put into square white bottles about 0·30 inch thick, and placed before the slit.

It is well known that many substances of similar color have produced very unlike absorption spectra, while others, which are very different chemically, have very similar absorption spectra, like chloride of iron and tincture of iodine. These facts are no objection to spectral analysis by absorption. It resembles analysis by polarization, which cannot be employed for all substances; but where it can be used, it is invaluable.

Analysis by the absorption spectra, of course, assumes various spectra to be known, and here stands a serious barrier in the way of its present extensive introduction, namely, the maps of absorption spectra, which are insufficient and incomplete. Drawings made in the ordinary manner are incorrectly reproduced by the lithographer or engraver, and rendered still more imperfect by the coloring applied. For this reason Dr. Vogel employs the graphic method as follows: Upon a horizontal line or abscissa he erects perpendiculars to represent the chief Fraunhofer lines, and represents the absorption of a given substance by a curve, the hight of which increases with the intensity of the absorption.

The absorption bands of the most important coloring substances lie between C and F; those which lie beyond C require sunlight for their study, which is not always to be had, and hence they are useless. At the request of certain wine dealers Professor Vogel has investigated and published the absorption spectra of pure and colored wines. Perfectly pure specimens of the following sorts of red wine were obtained from reliable sources, namely: Assmannhauser, Burgundy, Nuits, Cote d'Or, and Bordeaux. Although they differed in age and intensity of color, they give the same spectra.

Pure concentrated wine absorbs the whole spectrum to the orange. Dilute wine destroys the dark blue almost entirely, allows the light blue to pass, but absorbs the green and yellow green, and stops at D, while red goes through unchanged. Tartaric or acetic acid darkens pure wine inconsiderably. Ammonia changes the color of wine to a dark gray green, and makes it much more opaque, so that it must be strongly diluted in order to obtain the spectrum, which is totally different. Indigo and blue are strongly absorbed; the absorption sinks towards the green and is least in the yellow and orange, but exhibits a faint band in the orange. By lamp light, the absorption of alkaline wine is scarcely perceptible.

The spectral reactions of the substances employed to color wines are quite different. Those coloring substances which are objectionable to the taste, but not injurious to health, give reactions very similar to those of red wine. The juice of bilberry, sour cherry, and elderberry, and extract of mallow blossoms absorb nearly the whole spectrum. For this reason it is preferable to add one part of tartaric acid or of ammonia to 10 parts of the juice.

Opening to Navigation of the Vicksburg Cut-off.

The city of Vicksburg, Miss., is located on high bluffs, under which the Mississippi makes its way by sharp deflections, east and west, of nearly fifty miles from its direct course. During the late war the Union commanders sought to avoid the heavy batteries of the Confederates at Vicksburg, which commanded the river, by opening a cut-off or canal across the country, back of De Soto Peninsula, opposite Vicksburg. The river at the upper or northerly end of the canal was accordingly shut off by a dam; and the work of digging the channel was then carried on extensively, with every promise of success, until, by a sudden rise of the river, the water broke through the dam and put a stop to the work.

General Grant, finding that too much time would be consumed in the endeavor to repair and finish the channel, adopted other expedients for passing the batteries, and the canal was left unfinished. It has now, however, been completed by the silent mining operations of the river itself; and the boats pass up and down through it, avoiding the *détour* to Vicksburg, and thus saving about thirty miles of navigation. Our engraving shows the general position of the new canal cut-off.

A Canal from the Hudson to the Mississippi.

Mr. W. J. Abernethy, editor of the Minneapolis *Farmers' Union*, writes to point out that the two principal rivers—the Fox and Wisconsin—together form an almost unbroken water channel from the Father of Waters to the great lakes. Rising, the one in the southern and the other in the northern part of the State, they flow towards each other until their waters almost touch, when they suddenly sweep away at right angles, and empty, one into Lake Michigan at Green Bay, and the other into the Mississippi at Prairie du Chien.

In a few weeks, the canal which is to join the two will be completed, and Wisconsin will honor the event with appropriate ceremonies.

On the Fox River a system of slack water navigation has been adopted, which is proving entirely successful. There are numerous falls on what is known as the Lower Fox, and these are overcome by dams with locks, to pass boats around them. The work is so far advanced that, if no unforeseen obstacles occur, vessels can run up its entire distance to Portage (160 miles west of Lake Michigan) this fall, and pass over into the Wisconsin. Considerable dredging, however, remains to be done on this river.

The Wisconsin river is, at the portage, three fifths the size of the Mississippi at St. Paul. It is a rapid stream, full of floating sand, which in low water seriously obstructs navigation. Sections of the river have been improved by wing dams; but in order to permanently secure a navigable channel, it will be necessary, in some sections of it, to make a canal on the bank. According to surveys made for a canal by General Warren, of the United States Engineer Corps, it can be built, says our correspondent, the entire distance from Portage to the Mississippi, 118 miles, for $4,164,270.

SCIENTIFIC AND PRACTICAL INFORMATION.

DYNAMITE.

Sobrero, the inventor of dynamite, in a recent communication to the Academy of Turin, designated two of the operations in the manufacture of dynamite as especially dangerous: first, the mixing of the nitroglycerin with the infusorial silica (*kieselguhr*), and second, pressing the mass into molds for cartridges. In both cases an explosion may easily be caused by friction and pressure. Nobel recommends the following process as far safer, namely, to mix the silica with water to a dough, then press it into cartridge molds and dry perfectly. These cartridges are then put into nitroglycerin, which they absorb into their pores, the absorption being aided by exhausting the air. Sobrero made his experiments with infusoria of Italian origin which can be easily made into cartridges that will absorb as much as 75 per cent of their weight of nitroglycerin.

A FALLACIOUS TEST FOR LEAD IN TIN.

An item has been widely circulated, both here and abroad, in which it was stated that the presence of lead in tin could easily be detected by putting a drop of nitric acid on the clean surface of tin plate, heating gently to cause it to attack the metal and evaporate the excess of acid, and moistening the white spot with a five per cent solution of iodide of potassium; if lead were present, the spot would become more or less yellow from the formation of iodide of lead. Dr. A Puerkhauer calls attention to the fact that tin, free from lead, will also yield a yellow spot when thus treated, evidently due to the liberation of iodine by the presence of free acid; for nitric acid cannot be completely expelled from tin, even when the tin is heated to its melting point. It may be easily proved that the yellow spot, formed on tin which is free from lead, is due to the liberation of iodine, by touching the spot with starch paste. The above mentioned reaction can be made reliable by touching the white spot made by nitric acid with very dilute caustic potash before applying the iodide of potassium, when a yellow coloration will not fail to indicate lead.

SUBCHLORIDE OF COPPER IN VERDIGRIS.

Wittstein has found in some samples of acetate of copper a white precipitate, insoluble both in water and acetic acid, but soluble in dilute mineral acids. Investigation showed that this peculiar body consisted chiefly of subchloride of copper formed by the chlorhydric acid, which is always present in acetic acid made by decomposing crude acetate of lime with chlorhydric acid. For this reason manufacturers of verdigris would do well to use only such acetic acid as has been made by the use of phosphoric or sulphuric acid, as these acids are not sufficiently volatile to distil over with the acetic acid.

A GREEN VARNISH FOR METALS.

A varnish for small or large metallic articles can be prepared, says the *Industrie Blätter*, in the following manner: Finely pulverized gum sandarac or mastic (the latter, however, is too expensive for some uses) is dissolved in strong potash lye until it will dissolve no more. The solution is diluted with water and precipitated with a solution of a copper salt, either sulphate or acetate. This green precipitate is washed, dried, and dissolved in oil of turpentine. This produces a fine green varnish which does not change under the effect of light, and will be especially useful for ornamental iron work.

HERACLINE.

This is the name given to a new blasting powder, invented by Dickerhoff, and which has been tried with success in the coal mines of France and Austria. It is composed of picric acid, saltpeter, nitrate of soda, sulphur, and sawdust. The gases produced by its combustion are not injurious, it is claimed, and it burns comparatively slowly, so that it only tears apart the masses blasted, but does not hurl them violently about.

DECISIONS OF THE COURTS.

United States Circuit Court---District of New Jersey.

BOTTLE STOPPER FASTENING.—HENRY W. PUTNAM *vs.* HENRY W. YERRINGTON.

[In equity.—Before Nixon, J.—Decided March 28, 1876.]

Mere change of material used in the construction of devices is not invention; it is only the exercise of mechanical judgment, and hardly adds enough to the domain of knowledge to raise the person to the dignity of an inventor who first thought of making such a change.

The mere carrying forward of an original conception patented—a new and more extended application of it—involving change only of form, proportions, or degree, the substitution of equivalents doing the same thing as did the original invention, by substantially the same means, with better effects, is not such invention as will sustain a patent.

It is the invention of what is new, and not the arrival at comparative superiority, or greater excellence in that which was already known, which the law protects as exclusive property, and which it secures by patent.

A reissued patent must be for the same invention as the original, containing no new matter.

It is not meant by this that no new or different language should be employed.

New matter is such an enlargement of the original specification or claims as to include combinations or results which did not necessarily flow from the invention, as originally stated and described.

An inventor is entitled to all the uses to which his patent may be applied, and to all the beneficial results which legitimately follow the use of his instrumentalities, as shown by the statement of his invention, and the figures used to illustrate it; and such uses and results may be stated and described in an application for reissue by the inventor, without subjecting himself to the imputation of incorporating new matter.

NIXON, J.:

The bill is filed in this case for the alleged infringement of reissued letters patent No. 1,606, for a new and useful improvement in bottle-stopper fastenings.

The original patent was issued to the complainant March 15, 1859, for the term of fourteen years. This being duly surrendered, he obtained the reissue on the 19th of January, 1864, for the residue of the term, which was further extended by the Commissioner of Patents for seven years, from March 15, 1873.

The defendant, in his answer, and afterward by stipulation, admits the infringement of the four claims of the said reissue, but insists that the said patent is invalid for two reasons: first, because the complainant was not the original and first inventor; and second, because the reissue is not for the same invention as that shown and described in the original patent.

I have carefully compared the complainant's patent at first obtained with his reissue. The statement of his invention and the figures used to illustrate it are the same in both cases. Not a device or instrumentality appears in the second that was not exhibited in the first. He states results in the reissue which were not stated in the original patent, and which were omitted, I presume, because he did not know until he was taught by experiment that such results would follow. But an inventor is allowed to do this in a reissue without subjecting himself to the imputation of incorporating new matter. He is entitled to all the uses to which his patent may be applied, and to all the beneficial results which legitimately follow the use of his instrumentalities.

The principal new effect which he sets forth in the reissue, and which he failed to note in his former specifications and claims, is the substance of the first claim—to wit: Such a formation of the new fastener over the cork that the pressure thereon may cause the fastener to hold more securely, as specified. No new device was needed to accomplish this result, and hence the claim falls within the objects and purposes of a reissue.

[*Thomas H. Dodge* and *Palmer E. Havens* for complainant.
F. C. Nye and *L. C. Ashley* for defendant.]

United States Circuit Court---Southern District of Ohio.

THE UNION PAPER-BAG MACHINE COMPANY *et al. vs.* NIXON & CO.

[Before Emmons & Swing, JJ.—Filed March 20, 1876.]

It is not a fair construction of the assignment of a patent that the assignee shall first assign the entire right for a particular territory, and get its whole value from his vendee, and, after having thus received all the benefit he was entitled to under the transfer, sell single machines to be used in the same territory during the extended term.

An assignee of a patent, by granting and transferring the exclusive right to manufacture or use an invention within such State, exhausts his whole power of disposition under and by virtue of the assignment to him; and such assignee has no right to flood the country with machines to be used after the expiration of the term of the original patent, thus defeating the interest of the patentee in the extension.

The rise to use a machine after the expiration of the term of the patent is an incident to the primal right to use it during the original term; if that fails on account of fraud, the incident falls with it.

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