

Arts, Manufactures and Machinery.

Copying by Stamping—Coining.—Military Ornaments—Buttons and Printing Plates.

This principle of copying is extensively employed in the Arts. It is generally executed by means of large presses worked with a screw and heavy fly-wheel. The materials on which the Copies are impressed are most frequently metals, and the process is sometimes executed when they are hot, and in one case when the metal is in a state between solidity and fluidity.

The whole of the coins which circulate as money are produced by this mode of Copying. The screw-presses are either worked by manual labour, or by water, or steam power.

Medals, which usually have their figures in higher relief than coins, are produced by similar means; but a single blow is rarely sufficient to bring them to perfection, and the compression of the metal which arises from the first blow renders it too hard to receive many subsequent blows without injury to the die. It is therefore, after being struck, removed to a furnace in which it is carefully heated red-hot and annealed, after which operation it is again placed between the dies, and receives additional blows. For large medals, and those on which the figures are very prominent, these processes must be repeated many times.

Ornaments on military accoutrements and furniture ornaments are usually made of brass, and are stamped up out of solid or sheet by placing it between dies, and allowing a heavy weight to drop upon the upper die from a height of five to fifteen feet.

Buttons embossed with crests or other devices are produced by the same means, and some of those which are plain receive their hemispherical form from the dies in which they are struck.

The heads of several kinds of nails which are portions of spheres, or polyhedrons, are also formed by these means.

A process for Copying, called, in France, *Clichee* is applied to medals, and in some cases to forming stereotype plates. There exists a range of temperature previous to the melting point of several of the alloys of lead, tin, and antimony, in which the compound is neither solid, nor yet fluid. In this kind of pasty state it is placed in a box under a die, which descends upon it with considerable force.

The blow drives the metal into the finest lines of the die, and the coldness of the latter immediately solidifies the whole mass. A quantity of the half-melted metal is driven about by the blow in all directions, and is retained by the sides of the box in which the process is carried on. The work thus produced is admirable for its sharpness; but it has not the finished form of a piece just leaving the coining press. The sides are ragged, and it must be trimmed, and its thickness equalized in the lathe.

Wine Making in Portugal.

The grape is unquestionably the finest fruit in the world, and America possesses a variety of climate and soil unequalled by any other nation, not only for the growth of the best apples, which she now produces, but also for the best grapes, with proper cultivation and experience. Central Florida especially is peculiarly adapted for the cultivation of the vine and we hope that due attention may be paid to this subject by the citizens of that delightful region. The following account of the Wine making in Portugal by a correspondent of the American Agriculturalist, will be found both interesting and useful:—

Season of the Vintage—Weather.—The time at which the vintage commences on the Douro, varies from the beginning of September to the middle of October, according to the nature of the season, whether wet or dry, hot or cold. As the rosy skins of the grape swell with luscious juice when approaching richness, they are daily watched—every change in the sky is observed—and the anxious vine grower prays that no rain may fall to rot the tender fruit, and fill his tonels with water instead of wine. If threatening clouds appear, the careful and

more timid commence gathering their grapes ere they are fully ripe; the wise and bold, with more sagacity, allow theirs to hang, in hopes of return of sunshine; but when the vintage has once commenced, time is invaluable to all. At this period there are employed in the whole Port-wine district, at least 20,000 Gallegos and half as many Portuguese men, women, and children.

Gallegos.—The Gallegos are hard-working countrymen, generally honest, from Galicia, in Spain, who leave their homes in search of employment in the Portuguese vineyards and larger towns, as porters, water carriers, and other inferior grades of servitude. They are most parsimonious in disposition, often subsisting on a dried herring and a piece of black bread for each meal, and sleeping in some wretched hovel at night hardly fit for brutes. As soon as the vintage is ended, they return to their mountain homes, with five or ten dollars in pocket, which has been received as wages: or, perhaps, after years of toil, now and then an instance occurs, where one has accumulated \$100 to \$200, and retires to his native land to end his days in ease.

The Wine Press and Tonels.—The place in which the wine is made and pressed, is called in Portuguese a *lagar*. It consists of a tank from twenty to thirty feet square, and from two to three feet deep, formed of massive stone work, laid in cement, being raised considerably above the ground, and sheltered by a roof, supported on masonry, or posts.—At one side of the tank, generally in a lower building, there are large oaken tuns (tonels,) often holding thirty pipes, so situated that the wine may flow freely into them through a moveable gutter provided for the purpose. About midway above the tank, there is a heavy wooden beam, thirty or forty feet in length, confined at one end by a kind of socket, nearly on a level with the top of the tank, and weighed down at the other end by a large stone attached to a screw. When the men can no longer exact anything from the husks of the grapes, by treading, planks, or followers, are placed beneath this beam, and by the aid of the large stone and screw, the last remaining juice is pressed out.

While the men are carrying the grapes from the hill sides, and in emptying their baskets into the tanks, a boy stands, bare-legged, in the center, levelling the bunches with a rake, as they are thrown in, so as to form an even surface. As soon as the tank is filled with grapes, from twenty to forty men jump in, with their trousers rolled up, and commence treading, or rather dancing, to the sound of fiddles, guitars, flutes and drums, accompanied by the wild chorus of their own voices, for the space of two days and as many nights, with six hours rest between each eighteen, till the skins of the grapes are perfectly bruised, so as to extract every particle of their color, and their juice is completely expressed.

Fermentation.—After the men retire from the tank, the juice, husks and stalks are allowed to ferment together from two to six days. In the mean time, the husks and stalks rise to the surface of the liquid and form a compact mass; the color is still further extracted from the skins; and the stalks impart that astringent quality so much admired by all lovers of good Port wine.

Previous to drawing off the wine from the press into the tonels, it is of a dark, muddy color, sweet, nauseous, and sickening. The period at which it is thus drawn off, is the time when the rich and generous qualities of the grapes are liable to be lost or retained.—At this critical moment, the future success of the operation almost entirely depends; for, in consequence of the richness of the Douro grape the fermentation is generally so active, that, if suffered to remain too long in the press, it will be converted into a bitter liquid, unfit to drink, and of little or no value, except for making into vinegar. Therefore, in order to retain those highly-prized qualities, it is absolutely necessary to add brandy to the juice before that stage which causes bitterness begins. Nothing, however, can enable one to judge of this critical point, except long experience and a perfect knowledge of the business.

Brandy always has been, and always must

be, added to the richer and finer Port wines, which are intended for long keeping; for, from their very nature, they will overwork themselves, and, by exhausting their own strength, will ultimately be destroyed. 'Tis true, the grapes from which the richest of these wines are obtained, when hung up in the sun to dry, become complete masses of saccharine matter, or sugar; but this property is only possessed by those grown in positions most exposed to the sun, and afford that luscious and fruity flavor, of which no other wine can boast. With the poorer and more watery grapes, the fermentation, although less violent, will work out the little saccharine matter they contain, which will entirely disappear, in time, and a light, dry wine will be formed, requiring but little brandy to preserve it for the very reason, that it possesses fewer good qualities to preserve. Thus, the commonest green wine of Portugal will keep only a year without brandy, after which, it turns to vinegar.

It must not be supposed, however, that, because brandy is added to wine, it there remains; for, in reality it is lost by evaporation, in a very short time, particularly in hot weather, and consequently, when the wine is drunk, its strength has in no way increased, but diminished by age.

For the Scientific American.

The Salt Lake of the Rocky Mountains.

On one of the southern spurs of the Rocky Mountains, there is a valley full of geological wonders and curiosities, and is at present surrounded with a romantic interest, as being the place where that strange people, the Mormons, have taken up their residence. It is well known that a peculiar religion founded in the enthusiastic nature of a great number of men and women of all nations, separated the Mormons from all other people in the State of Illinois, where they once had a flourishing colony. It is also well known that persecution on the one hand and bigoted religious feeling on the other, expelled the Mormons from the borders of our Republic. Taking up their march like the Israelites of old, they have become dwellers in a strange land. Wandering forth from the United States, they took up their line of march for the far, far West, and a portion of them have settled in a valley of California, in which there is a lake of salt water, so salt that it is impossible for a man to sink himself in it above his arm-pits, and after bathing there awhile and drying himself he will be encrusted over. Into this lake there empties a fresh water river cold and sparkling from the snowy mountains, and which the Mormons have named the Jordan, in the striking coincidence of that river flowing into the Dead Sea. There is no rain in that part of the world, and the land is watered by turning the cooling brooks from their "water courses," among the fields. They have no need of ice houses as they dwell only four miles from the region of snow and the water does not get warm before it is dancing at their doors. There are also hot springs on the mountain, boiling hot continually, thus indicating subterranean fires which will one day banish the Mormon from that land by a far fiercer tempest than that enmity which drove them from our midst. The hot waters rush out in great volumes. The water has a sulphurous smell but is of a clear blue color, and the people go there to bathe for various diseases. There are but few natural fruits in the valley, but the soil will bring forth an abundance by good cultivation, and there the strange Mormon may enjoy the fruit of his toil in peace, if he be peaceful himself. From this religious outcast Saxon race there will spring a stock, which in the course of two centuries will be found to possess some of the characteristics of their forefathers. Religion and climate produce strange mutations in the physical and mental economy of men.

A New Operation for Deafness.

M. Bonnafout of Paris, a military surgeon, gave an account before the British Academy of Sciences, at a recent session, of a method used by him in cases of deafness, to discover whether the nerve of sound has lost all its susceptibility. He has ascertained that the skull is a good conductor of vibration, and that if it be struck by vibrating objects, the nerve of the ear is acted upon whenever its susceptibility has not been entirely destroyed.

Compensation.

Dedicated to the N. Y. Scientific American.

One of the finest instances of compensation in the world is found in the perpetual renovation and purification of the air we breathe.

Nothing else more beautifully illustrates the saying of the wise Hebrew, that all the works of the most High are made two and two and set one against the other.

The animal kingdom lives by breathing as well as by eating. From man down to the sponge, all animals eat and breathe. By breathing we mean that they absorb oxygen from the air, and return an equal volume of carbonic acid gas,—composed of the oxygen they had absorbed and carbon from their blood. This supplies their animal heat, it is in fact the burning of charcoal, as internal fuel. Men do this breathing in their lungs, fishes in their gills, insects by little tubes; all creatures in some manner absorb oxygen, and return carbonic acid.

But carbonic acid is deadly poison to animal life. All animate things therefore are perpetually robbing the air of its power to give them life, and filling it with poisonous gas.

Mark now the beautiful arrangement. All vegetable things absorb this carbonic acid, and return an equal volume of oxygen gas, retaining the carbon to the growth of their own substance. From the oak down to the minute *conferva*, known only to the microscopic eye, all plants have this only source of carbon, in the stores of carbonic acid in the air, absorbed by the water and carried to the leaves, or growing tissue.

Again, all animal things live, directly or indirectly on vegetable things. Thus, then, does the perpetual movement of nature run through its grand and simple chords. Plants are the food of animals, and purify the air for animals to breathe. Animals live upon plants, and restore to the air the food for plants to feed upon. Who was the Master composer that arranged so wide and deep a harmony?

The above article is taken from the *Philadelphia City Item*, "dedicated to the Scientific American," and the train of ideas so beautifully woven together was no doubt suggested by reading some article which appeared in our columns. Truly may we say, He is a Master composer who has arranged in harmony all the works of Creation. Beautiful is the allusion of Sacred Writ to the period when this world was wheeled in harmony amid the music of the rolling spheres, "when the morning stars sang together." There is also another harmonious arrangement in Creation besides the adaptations of one thing to another, and that is, the exact position or collocations of created things,—their relative place as well as their relative nature. This view of the matter is handled in a most masterly manner by Chalmers in his *Bridgewater Essay*, but in no display of physical law do we find more to admire, in the wisdom and goodness manifested to man, than in the renovation and purification of the atmosphere as elucidated by the above article.

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To the Editor of the Scientific American.

SIR:—Will you allow me to ask through your wide spread journal, what the difference is in the movement with regard to the friction of a pump box that is attached to a spear, (or what is sometimes called a plunger,) whether the pump remains stationary and the box or plunger moves up and down in the pump, or whether the pump is turned lower end up and moved up and down while the box or plunger remains stationary fastened at the bottom. The question is barely with regard to the friction around the inside of the pump where the stuffing moves in order to raise the water. Your answer to the above to decide a dispute or difference of opinion between a scientific West Point Engineer and a Mechanic, through your paper, will much oblige,

Your friend, A MECHANIC.

"Mechanic" is informed that there is no difference in the friction. Truly, he must be a very scientific Engineer who would assert that the turning a pump bottom side up causes an increase of friction between the tube of the pump and the stuffing box.