

THE LEADING AND GLASS PAINTING INDUSTRY.

Glass painting is supposed to have attained its first great development in Italy in the thirteenth century. The French also claim the honor of inventing the process of painting upon the mosaic windows of colored glass and transforming them into works of art and also teaching it to the English, who in their turn instructed the Germans. The oldest specimen of glass painting now existing is a window of the thirteenth century, in a church at Neuwiller, in Alsace, representing St. Timothy. The glass used at the present time is bought from the manufacturer in colored sheets about five feet in length and about two feet in width and running from one-sixteenth to one-eighth of an inch in thickness. The colors mostly in use are the rubies, yellows, blues and emerald greens. These colors are produced by adding to the material in the melting pot small quantities of various metallic oxides and other mineral substances. The colors yielded vary

ferent sizes, having at the top an iron shelf on which the glass is placed. The surface of this shelf is first covered over with whiting to keep it from coming in contact with the iron. The glass is then laid on and the cover of the kiln, which has an outlet for the heat at the top, is fastened down. The kiln is then heated by means of a number of gas jets attached to two circular reservoirs which are connected to a gas pipe at the bottom of the kiln. The heat from the jets causes the paint to melt and fuse into the glass. The firing operation takes from two to ten hours. The firing is completed when the color of the glass is between a red and a white heat. After fusing, the kiln is then allowed to cool. When the glass is sufficiently cooled, it is

sponding pattern on the working plan, each strip being held in place by means of nails driven along the sides until all of the pieces which compose the window are leaded. The joints are then soldered. The operation is performed with the common soldering iron with a solder composed of tin and lead. The irons are heated in an oval shaped gas stove about sixteen inches in length and about eight inches in height and width, and lined on the interior with fire brick, the jets of gas heating the stove and irons from the bottom. Before soldering each joint is rubbed over with an adamantine candle, which causes the solder to stick. A number of odd-shaped knives are used for the purpose of lifting up the glass in place, and also for smoothing down and trimming the lead joints. The jewels are made in different sizes, colors and shapes, some being oval, round and oblong; some are rough and others highly polished. A great number of stones, pebbles and clam shells are also used as jewels.

After the soldering operation is finished it passes through the cementing process. A cement composed of red lead, oil and drier is rubbed over the leaded window with a stiff brush, the rubbing forcing the cement underneath the overlapping joints, making them watertight when hard. The surplus cement is then cleaned off and the window dried by rubbing a quantity of whiting over the surface. From one to three pounds is required to lead a square foot of glass, the operation taking about two hours. The leaded windows are sold by the square foot, ranging in price from \$1 upward. Fifteen hands can turn out about 1,000



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in intensity according to the proportion of oxides used. Colored glass is used principally for ornamental windows in churches, public buildings, private residences, signal lights, and for imitation of precious stones. Some of the styles of glass, such as the antique and cathedral, unless held up to the light, have a dead appearance. Opal is a glass that is clear, the sheets being both smooth and corrugated. Venetian is a rough and smooth glass polished on both sides. Parties ordering ornamental windows have a small colored design of the window submitted to them for their approval by the artist. If accepted, two outline drawings are then made the exact size of the window, showing the shapes and forms into which the glass is to be cut. The forms or patterns are then cut out of one drawing and used as a guide for the glass cutter. The paper strip, representing either a square, circle, or diamond, etc., is held down firmly on a sheet of glass by one hand of the operator, while with the other he draws a diamond around the edge, cutting or scoring the glass, which, by tapping it lightly, separates the piece from the sheet. This operation is repeated until all the parts have been cut. In olden times the glass was cut by the aid of a hot iron, and was also reduced to the correct shape by a grooving iron, the diamond not coming into use before the seventeenth century. If figures, animals, flowers, etc., are to be painted on glass, the outline of the design is first traced on with a solution composed of a black or brown mineral paint, pulverized glass and oil. The pieces or parts of the glass on which the outline is drawn are then placed into a firing kiln. The kiln is made of sheet iron of dif-

taken from the kiln and attached to an easel formed of a large transparent sheet of glass. The shadows and middle tints are then painted in the highest lights, being the pure color of the glass. The deepest shadows are solid black, produced by painting the color on thickly. The pieces, when painted, are again put into the kiln and fired in the same manner as before. The color on the glass is opaque when put into the kiln, the action of the heat causing it to become transparent. The color used formerly was a mixture of pulverized copper, pulverized green glass and sapphire, the three ingredients being ground on the same stone with wine or urine and put into an iron vessel ready for painting. The glass strips, whether plain or painted, are then leaded. Each piece of glass is cut a little smaller than the pattern in the working plan, so that the piece, when leaded, will exactly fit the pattern. The ribbon or lead strip is first run through a mill containing two dies, which forces or presses the strip into the right shape and thickness. These strips are grooved on two sides and are wrapped around the edges of the glass by hand. Each leaded piece, beginning with the border, is then placed over the corre-

square feet monthly. The sketches were taken from the plant of Charles Maginn, New York City.

Motor Men Must be Protected.

The constitutionality of the street car vestibule law in Ohio is upheld by the Supreme Court of that State in a decision recently handed down. The law was passed in April, 1893, and requires all companies to provide electric cars with vestibules to protect the motor men from the severity of the weather during the winter months. This has already been done voluntarily in several Eastern cities, and a number of States, including Minnesota, have passed similar laws. It seems that the Ohio companies opposed the law, and the lower courts generally held that the statute was unconstitutional. This decision has now been reversed by the Supreme Court of the State.

Riverside, California.

A correspondent of the N. Y. Tribune writes as follows:

To one who drives through the shaded avenues of Riverside and notes the superb orange and fig trees towering far above the roofs of the houses, it seems scarcely credible that twenty-three years ago this garden spot was a dreary, barren plain, known among those who used the road that passed through it as the most wind-swept spot for leagues around. The beauty of its outlook on the snow-capped San Bernardino Mountains and its proximity to the Santa Ana River commended the place to the founders, who came mainly from the Mississippi Valley States. These men had the usual hard fortune of pioneers. When they settled here in 1871 and began to plant their twenty-acre tracts, the fig and the raisin grape were the favorites with California horticulturists. So these two were planted. The fig has never been a product that could be handled with profit here, because the California grower has failed to acquire the skill in packing of the Smyrna dealer. The raisin also was voted a failure at the outset, because the process of curing was not scientific, as it is to-day.

So the men who planted figs and vines rooted up and burned them, and started in afresh with the budding navel orange. They were laughed at by those who had grown the seedling orange at San Bernardino and other places. They were told that this new and tender variety would never endure the occasional frosts. But the great majority were shrewd enough to see the immense prospective market for a sweet, juicy orange without seeds, and their good judgment was soon demonstrated. When it was proved that the orange could be depended upon, in good seasons and bad, to produce \$250 to the acre above all expenses, there was a great rush to plant it. Young trees only two years old actually sold as high as \$1.50 each and for several seasons never fell below \$1 a tree. Nurserymen made fortunes while this orange boom lasted. Now you may buy the choicest young orange trees for 25 cents each and the standard price is 10 cents. Yet the planting in the great boom years was not so great as now, when values have settled to a reasonable level and the craze for speculation in town lots has become only a memory.

It is ten years since the writer saw Riverside, and the changes made in this decade are enough to make one doubt the accuracy of his senses. In 1884 Riverside had just been incorporated as a city. Its population was 2,500 and its property was valued at \$1,000,000. It had just begun to establish a reputation as one of the best orange growing sections of California. Now its population is 7,500 and its assessed valuation is over \$6,000,000. Last year it became the county seat of the new county of Riverside. Its shipments of oranges average \$1,500,000 a year. It has forty-six miles of main canals and over 200 miles of lateral ditches and pipes. One entire suburb, which ten years ago was a barren mesa, has been transformed by artesian wells into a garden. The same system of development is going on all around Riverside and it bids fair in a few years to make this rolling plain between the coast range and the San Bernardino Mountains one continuous orange grove and vineyard.

Riverside is forty miles from the ocean as the crow flies and sixty miles due east from Los Angeles. It lies at an altitude of 1,000 feet above sea level. The ocean breezes reach it every afternoon, except in the fall, when the trade winds fail to blow. The mountains, only thirty miles away, make the nights cool and pleasant. It is removed from the main lines of railroad travel, yet it is closely connected with both the Southern Pacific and the Santa Fé systems. In winter there is an occasional frost that damages the oranges, but these disasters are not so frequent or so serious as in Florida.

A drive through Magnolia Avenue gives the stranger the best idea of Riverside and the causes of its prosperity. The name of this drive is a misnomer, though it is beautifully shaded by peppers, eucalyptus, fan palms and grevillas, there is almost an entire absence of the magnolia, which failed to flourish. This avenue is lined with three rows of trees, one on each side and one in the center. These trees have now reached a height of thirty feet, and cast a delightful shade upon the hard, smooth road. Upon either side are orange groves, that come almost to the artificial stone sidewalk. Few division fences or even hedges are seen. One passes house after house, built in the old-fashioned Southern style, with verandas around three sides, and with roses and other plants climbing over the doors and windows. A few places have lawns and ornamental shrubs, but in the great majority every bit of land has been utilized. Yet the beauty of the foliage of the orange, relieved as it is during several weeks by the golden fruit, makes even the homes without flower gardens a delight to the eye.

It is a constant surprise to turn from these spacious houses, surrounded by orange groves, to the avenue in front, with its artificial stone sidewalks, its street railroad, its electric lights, its postoffice boxes, and all the usual features of city life. Yet this intimate union of

the country and town life is the chief thing which sets Riverside apart from most other California colony towns. The town has the Waring system of sewerage: the streets are sprinkled constantly, so that one may ride for a whole morning and not be annoyed with dust; the water supply is so arranged that all the water for drinking and household purposes is aerated as it leaves the covered reservoir, and is brought in pipes to the town. No barroom is permitted within the city limits.

The feature of Riverside that excites the astonishment of the stranger is the spread of the city over the neighboring hills. The old town was laid out on the level land, near the river, but all the later development has been on the high, rolling plains that stretch back to the mountains. These plains are broken by buttes, or small mountains. One of the prettiest of these hills is Arlington Heights, which boasts of a handsome driveway called Victoria Avenue, stretching for ten miles parallel to Magnolia Avenue. Another is Victoria Heights, from which one may obtain a superb view of all the orange-producing country from Riverside to old San Bernardino—a country which in twenty years will show few acres not planted with the orange or other fruit tree.

Perhaps the most remarkable thing in the development of Riverside is the perfection of the water supply. The men who founded the town were far-seeing enough to obtain a large supply of water for irrigation, but even this was soon seen to be inadequate. Tracts of the finest land lay too high for the river water to reach them. Without water they were worth not more than \$10 per acre for agricultural purposes, as no crop could be expected in a dry year. With water they would easily sell for \$250 an acre. A poor carpenter of Riverside, Matthew Gage, studied this problem of supplying the high lands with water. He finally concluded from experiments that artesian water could be reached anywhere on these mesa lands. So he obtained financial backing, bought up all this land at a low price, and then sunk his wells. He soon had a fine flow, and by piping the water to all parts of the tract he had 3,000 acres adapted to the orange and lemon. His company has sold 2,000 acres, which are now planted to the citrus and deciduous fruits. This planting has transformed a hideous, barren plain into one continuous orchard and garden.

Everywhere about Riverside one sees the signs of the life-giving water. As you approach old Riverside you pass across the Santa Ana River, from which runs an irrigating flume 7,000 feet long. At its end is a tunnel 3,000 feet long, which carries the main ditch through the heart of a high hill. The main ditch that passes through the town is ten feet wide at the bottom, and the sides are as carefully cemented as if they were the floor of a household cellar. Many of the lateral ditches that supply the groves are open, but these are kept beautifully clean, and the running water is an ornament, for it makes one forget the fierce heat of the midsummer sun.

One Aim in Business.

Probably nothing would more effectually serve to elevate every honest occupation, and to ennoble every worker therein, than a realizing sense of the service thus rendered to the community. Most people pursue their various employments as a means of livelihood, or of increasing their personal advantages and comforts, and these motives are perfectly justifiable. The mistake they make is that they have no other. They do not reflect that their work is also a means of promoting the welfare of the community; or if they admit the fact, it does not come home to them in that impressive way which would lead them to receive it as an aim to be achieved. There are a few pursuits where it is expected that this end will be kept in view, and where the worker that has within him no motive but that of self-interest is held to have degraded his high calling, but that all employments demand so high a standard of action is an idea floating in the air, perhaps, but by no means brought into general or practical use.

In commercial life, for example, the profit of the individual usually occupies so large a proportion of the attention that but little is left for the real benefits which commerce itself bestows upon the people at large. That it furnishes a livelihood to multitudes and fortunes to some, are by no means the greatest of its benefactions. Its contribution to the comfort and convenience of the public by bringing necessities and enjoyments within the easy reach of all is incalculable. In this respect alone it is one of the chief factors of civilization. But it does much more than this. It draws men together by common interests. It binds the East to the West and the North to the South. It even unites countries between which oceans roll, enabling various nations to mingle, and thus to understand and to respect each other. By encouraging travel it spreads ideas and methods, conserving and establishing the best, and planting them where they have hitherto been unknown. Thus, through the influence of commercial enterprise, the differences that mark different states and nations, instead of proving insuperable barriers to friendly intercourse, are made to

subserve mutual improvement and to enable each one to make continual advance.

There is another and even more important benefit which commerce bestows upon society, that of increasing trust and confidence by promoting honesty and equity. We hear and read of so many instances of cheating and overreaching in trade that we forget that these are the exceptions and not the rule. Every case of dishonesty is pointed out and emphasized, while of the thousands of honorable merchants and tradesmen of all kinds nothing is said. We are accustomed to think much of the great temptations to unfairness and double dealing that beset the young man entering business, and it is well that he should be put upon his guard against them, but it is also true that mercantile life as a whole is a school wherein integrity and rectitude must be among the chief lessons. For commerce is built upon trust, and whatever shakes or undermines that trust weakens the whole structure. If roguery and unfaithfulness were general, the foundations of business would give way, and commercial enterprise would no longer be possible. It is but a poor and temporary gain that the shortsighted swindler or the dishonest trader obtains. He is speedily discovered and shunned, and sooner or later is ostracized from the business world as completely as the sensualist or the drunkard is ostracized from good society. True gain is not the transference of money from one man's purse to another, without adequate return, but the increase of social welfare by efficient and intelligent labor. When this is realized and acted upon, commerce will attain a sure and permanent success, in which all engaged in it will be sharers.

Thus, while business life depends for its true prosperity upon good faith, rectitude and honor, so in its turn it fosters and encourages these virtues. Mr. Lecky, in his "History of European Morals," speaks of industrial veracity as that "accuracy of statement or fidelity to engagements which is commonly meant when we speak of a truthful man. . . . This form of veracity is usually the special virtue of an industrial nation, for, although industrial enterprise affords great temptation to deception, mutual confidence, and, therefore, strict truthfulness, are in these occupations so transcendently important that they acquire in the minds of men a value that they had never before possessed." If this be so, it gives to business life an ethical character that is seldom accorded to it. Nor do the virtues it inculcates end with itself. When we occupy a high standard of action in one part of life, it raises that of all the rest. One who has been accustomed to be faithful and loyal in his home is not likely to be false in his friendships, and if business requires integrity in its followers, the seeds thus sown will blossom out in other spheres, and thus a better character, as a whole, will result as the fruits of its influence. Is not such a result worth reflecting on and planning for? Do not let us lose sight of it in the effort for personal gain. Let us ponder on the good of trade, not only to the individual trader, but also to the community, to the nation, to the world. Just as the faithful physician feels himself bound by the honor of his profession to promote health and alleviate suffering, so let the upright merchant realize the noble mission of his occupation and strive to do his share toward furthering it. The duty of service comes to us all, and nothing tends more directly to elevate our employment and to dignify our relation to it than to hold this duty close to our hearts and prominent in our lives.—Public Ledger.

Work versus Worry.

It is a well understood fact that it is not work that kills, says the Massachusetts Medical Journal, but worry, and from this text some most sensible and profitable hygienic discourses have been preached during recent years. The conclusion of the whole matter is this: Brain work is conducive to health and longevity, while brain worry causes disease and shortens life. The truth of this statement, and its application to what we see around us, are evident enough; yet it is well that such subjects should be continually discussed. A life of intellectual labor, although severe, like that performed by the judges of our highest courts, or by scholars and persons devoted to literary pursuits, if unmixed with excitement, and followed with regularity, is not only a happy life, but is seen also to promote bodily health and long life. On the other hand, mental cares, attended with suppressed emotions, and occupations which from their nature are subject to great vicissitudes of fortune and constant anxiety, break down the lives of the strongest. Every one has seen a class of men whose early mental training was deficient, and to whom the writing of memoranda was irksome, engaged in middle life in great undertakings, and taxing the memory with a mass of complicated business accounts, simply because they could more easily remember than write. Their poverty of memory for a certain kind of facts is often truly astonishing; but the strain is at last too much, and they die before their time. The brain worry of our school children might furnish useful illustrations of the truth of the same general proposition, but we forbear. "Don't worry."