



The beauty of Plate Glass lies in its perfect reflections of lights and shadows. Like the mirror-lakes of mountain scenery, it repeats nature's pictures

# The AGE OF PLATE GLASS

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ISTORIANS have a way of dividing the progress of man into convenient periods characterized by the pre-dominant use of some basic material. Hence we have the stone age, the iron age, the bronze age, the steel age and the age of precious metals, and now it may be said we live in the age of Plate Glass.

Antiquity obscures the actual origin and discovery of glass, but its development and perfection for glazing purposes has taken place in comparatively recent years. For centuries after the discovery of glass, it was used chiefly for ornament and in art. Not until the fourth and fifth centuries was the value of glass as something to look through rather than to look at realized.

Used for Centuries to Look At, not Through

The early window glass was not blown, but cast—poured out, molten, on a flat surface, and then smoothed more or less crudely. About the eleventh century this method was replaced by the first crude beginning of the blown-glass method of today. The original casting process was lost to knowledge until the French in the seventeenth century re-discovered it. That re-discovered process was the real beginning of what is now the highest development of the glass maker's art—the manufacture of Polished Plate Glass.

## GLASS MAKING IN AMERICA

Virginia Colonists Made Our First Glass

The first colonists who came to make their new homes in the wilderness of the new world had been educated to the need for window glass. But the difficulties of shipping discouraged its transportation to the new world. So they brought with them "eight Poles and Germans to make pitch, tar, glass and soap ashes." Somewhere in the Virginia forest, about a mile from Jamestown, about 1608 or 1609, the first "glass factory" was erected.

This enterprise soon succumbed to the interest in tobacco raising which engrossed the colonists for several years. The second attempt to found a glass industry was begun a few years later with Italian artisans to man it. But this second factory devoted itself to the making of glass beads which were then used as currency in trade with the Indians.

Years of Discouragement

From that time on until long after the Civil War the story of glass making in America is one long dismal record of failures. Steady, relentless competition of foreign glass throttled every serious attempt to make glass manufacturing succeed in America until comparatively recent years.

The first undertaking of any consequence in making Plate Glass in this country was at Cheshire, Massachusetts, in 1850. But that venture failed and it was not until after 1880 that Plate Glass was manufactured at a profit to the producer. From that time, America was no longer helplessly dependent on the glass-making science of Europe.

## PLATE GLASS IN THE MAKING

HILE the manufacture of Plate Glass has passed through many stages of development, and the various processes A Difficult have undergone revolutionizing changes, the making of Plate and Glass remains one of the very difficult arts. To the layman, the most interesting and amazing feature of its manufacture is the fact that the pot, or crucible in which the materials are melted together and fused, requires years for its preparation and lasts only a few days in service. The long time required to produce a pot and its short life, means carrying an immense stock of pots. In large factories, as many as 5,000, each weighing 3,000 pounds, are kept in storage, and the space thus occupied is immense.

Fine Art

Each pot is capable of melting at one time one and one-half tons of glass. It requires nearly a day and a night, at a temperature of from 2,500 to 3,000 degrees, to complete the melting.

The work of making the pot begins three years before it is to be used. The clavs, after they have been taken from the mines, Years to are exposed to the weather so that they will disintegrate and Make the the impurities oxidize. This seasoning process takes at least a year or two, according to conditions. The clay is then ground. screened, mixed accurately with certain other ingredients and "pugged" or kneaded. After kneading, the clay must be stored again, to ripen, a process requiring about six months.

Melting Crucible

The pot itself is made by a highly skilled workman. Hand work is necessary, because a slight defect, such as an air cavity, which would cause the pot to crack in the furnace, could not be detected if the pot were made by machine. The pot maker builds up his pot, layer by layer, with infinite care. The finished pot must then be stored again for six months or a year for its final seasoning.



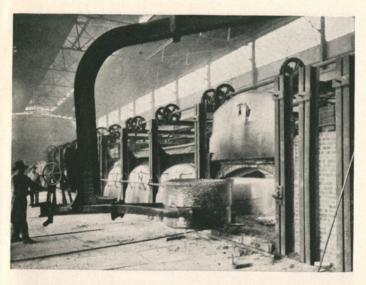
Patiently the pot maker forms rolls of clay and builds his pot, layer on layer with infinite care

Where the Fineness of Plate Glass Begins

When the pot is finally ready for the furnace, it is given a test baking in a heat approximately the glass-making heat. If it passes, it is filled with the raw materials of the glass. After all those years of careful preparation, the pot lasts on the average, only twenty days!

If the pot passes the first test, it is filled with the raw materials of the glass, and placed in a furnace in which there is room for twelve to twenty pots. The terrific heat of the furnace causes the materials to shrink so that the pot has to be re-filled three times to insure a full pot of molten glass at the end of the melting.

Handled by Electric Cranes When the melting has reached an exact point, the big pot, glowing incandescent from the intense heat of the furnace is grasped by huge electric tongs and lifted from the furnace. An electric crane swings the pot over to the casting table, a steel



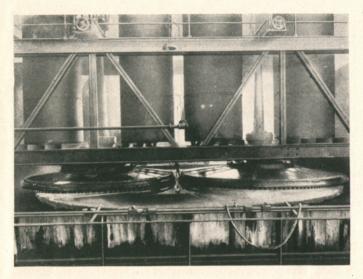
Pots are conveyed from furnace to casting table by great electric cranes controlling huge pairs of tongs

slab, thirty-two feet long and twenty feet wide, and pours its contents so that they will flow over the full length and width of the table.

A steel roller, weighing twenty-five tons then advances and rolls the molten mass flat to a thickness of approximately half A Heated an inch. The glass by this time has cooled greatly, but is still Tunnel intensely hot. To prevent sudden cooling in the cool outer air, 800 Feet the plate is rushed without the slightest delay to an annealing Long oven, or "lehr" as it is known to the glass workers. This lehr is like a tunnel, about eight hundred feet long. An electric conveyor carries the plate through this tunnel very slowly—so slowly that it requires five hours for the plate to traverse the



The pot, poised a moment above the casting table, is tilted so that the molten contents pour in a thick, dazzling flood across the table's width, and immediately the 25-ton steel roller moves forward, spreading out the molten mass before it as a cook rolls out dough



Mammoth disks revolve upon the surface of the glass, and with the aid of sand grind the plate to perfect smoothness

entire length. During its passage, the plate passes through a series of varying temperatures, each a trifle cooler than the last, until it emerges at the temperature of the outer air, or cool enough to handle. This process of annealing must be carried on with the greatest care, for any irregularity in the cooling may, and frequently does, produce an internal stress sufficient to shatter an entire plate.

Revolving Under 124,000 Pounds Pressure

The plate is now ready for the operations of grinding, smoothing and polishing. Electric cranes again lift the plate onto the huge circular steel tables covered with wet Plaster of Paris to hold the plate in place. The tables, which are on wheels, then are towed by motor car to a place beneath the grinder.

Massive iron-shod runners revolve over the surface of the glass. As the table bearing the glass revolves, water and sand are fed under the runners, which are lowered slowly until their entire weight of 124,000 pounds rests on the glass. Under this powerful abrasive action, the surface is ground with absolute uniformity until all the irregularities in the rough glass are ground away. As the grinding continues, finer sands are substituted for the coarser grades, and during the last stages. a still finer abrasive, emery, is employed, in several different degrees of fineness.

Getting Its Brilliant Polish

When all the irregularities of surface have been removed. and the glass is reduced to approximately the desired thickness. the glass is polished. The polishing machine is similar to the grinding machine, but instead of iron shoes, it carries many buffing disks of felt, each about eighteen inches in diameter. Red oxide of iron, or rouge, as it is commonly called, the finest known abrasive, is fed under the buffing disks as they revolve. The glass is then reversed and the other side ground and polished. This polishing operation gives to Plate Glass its beautiful. brilliant surface.

The grinding and polishing completed, each plate of glass undergoes a painstaking inspection for defects. When it has passed this examination, it is a clear, polished plate, ready for the numberless uses which modern civilization has found for polished Plate Glass.

## PLATE GLASS IN MODERN LIFE

Perhaps no other material used in building our modern cities has changed the conditions of life so much as glass. Common Windows of sheet glass had been used for centuries as a means of admitting Refinement light to dwellings without exposing the interior to the ravages of severe weather. Plate Glass is the modern refinement of glass

for this purpose, and of recent years manufacturing methods have so reduced the cost as to bring it into general use.

Plate Glass performs a function that cannot be equalled by any other glass. It gives absolutely true vision without distortion or interference. Its body is almost as clear as the open



A well-designed house, the pride of its owner and builder, deserves nothing less than Plate Glass in its windows

air itself and its surfaces are free from the familiar waves, swirls and curlicues of sheet glass. Viewed from any angle, objects seen through Plate Glass appear exactly as they are.

Plate Glass is most familiar to us in the display windows and show cases of up-to-date stores. Daily we pass the Plate Glass fronts that line the business thoroughfares of cities the world

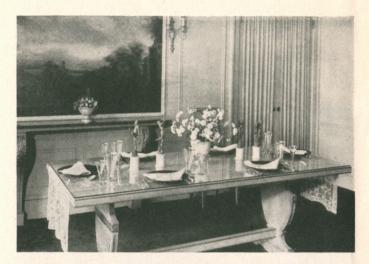


Plate Glass not only protects the table top, but reveals its beautifully finished surface

over. We hardly give a thought to the Plate Glass because we look through it at the display in the window, hardly seeing the glass itself. We see the goods displayed in the window, clearly, as if the glass were not there—yet the goods are protected from the wind, rain and theft.

Gleaming

In New York City, the Woolworth Building, the tallest office building in the world, and the Equitable Building, one of Avenues the largest office buildings in the world, Plate Glass is used of Glass throughout for glazing. In these world-famed buildings, Plate Glass was specified because of its beauty, clarity, durability, adaptability, and resistance to wind.

> Architects, builders and home owners are realizing more and more the value of Plate Glass in residence windows and

doors. It is being used for this purpose to an extent undreamed of a few years ago. For beauty and utility, Plate Glass cannot be approached by any substitute. Its utility lies in its absolute clarity when looking through it from the inside. Its beauty lies in its brilliantly polished surfaces when seen from the outside. Plate Glass shows reflections of the surrounding buildings, sky and foliage, with fidelity of tone and outline. There are no annoying wavy reflections. Plate Glass makes all the difference in the world in the appearance of a house. Yet it costs surprisingly little more compared with the total cost of the house. The Plate Glass for almost any house need not cost more than one per cent of the total.

Windows that Reflect Pictures

# PLATE GLASS FOR MOTORING COMFORT

To Plate Glass is due the credit for a large degree of the comfort of motoring in modern motor cars. It was Plate Glass that made the windshield possible. The occupants of the early cars were harassed by the terrific rush of wind created as the car sped forward. Plate Glass offered complete protection

without the slightest interference with clear vision. Now Plate Glass is used not only in the windshield, but in the side windows of closed cars and the curtain windows and windshield wings of open cars.



# PLATE GLASS FOR MIRRORS

The first mirror was made centuries after glass was discovered. Imperfect as they were, mirrors were used merely as look-

ing glasses for many years before their value as decoration was realized. For this purpose, they did not come into use until after American the perfection of Plate Glass. Made I Intil that time mirrors were made Mirrors of common sheet glass. For many years, the best Plate Glass was Unexcelled made by the French and Belgians and for that reason, the term "French Plate" became the symbol for the finest mirrors made. This term has long since lost its significance, however, as there are no better mirrors made than those made right here in America of American-made Plate Glass. Today Plate Glass mirrors are daily

> important element in the interior decoration of homes, clubs, and

> hotels. The mirror at its best is

an exquisite bit of decoration.

day Plate Glass mirrors are daily

Exquisite growing more popular. Interior

Decorations decorators are using them as an



A mirror can be an essential part of the artistic scheme of interior decoration as well as a utility

## PLATE GLASS FOR TABLE TOPS

THE usefulness of Plate Glass seems almost limitless as new uses are constantly being found for it. The newest popular use for Plate Glass is as a protection to fine furniture. Interior decorators are using Plate Glass to cover and protect dresser



tops, table tops, buffet and serving table tops, and window sills. A finely finished table top soon becomes dulled with a myriad of tiny mars and scars and perhaps ugly scratches. Plate Glass not only protects the top from the ravages of every day usage, but it also adds a rich beauty of its own.

Plate Glass is now coming into almost universal use as a covering and protection to dresser

tops. Perfumes, toilet waters and cosmetics contain alcohol. The alcohol runs down the side of the bottle, and, wherever the bottle comes in contact with the varnish, it leaves an ugly mark.

Truly this is the age of Plate Glass. Hundreds of times daily we make use of the comforts and convenience of Plate A Daily Glass, perhaps without being conscious of it. Yet there is Comfort probably no other material that has done more to change our conditions of life. Civilization owes much to the pioneers of the Plate Glass industry who labored so hard and at so great a cost to bring Plate Glass within the means of all.

Protection and Beauty



Nothing Else is Like it