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DECEMBER, 1891.

THE RISE OF THE POTTERY INDUSTRY.

By EDWIN ATLEE BARBER.

THE DEVELOPMENT OF AMERICAN INDUSTRIES SINCE
COLUMBUS. X.

FOREIGN writers would have the world believe that the United States can boast of no ceramic history. Even our own chroniclers have, singularly enough, neglected a branch of our industrial progress which is not altogether insignificant nor devoid of interest. On the contrary, it can be shown that the fictile art is almost as ancient in this country as in Great Britain, and has been developed in almost parallel lines.

The first European settlers found the American natives proficient in the manufacture of earthen vessels, and we would not be justified in supposing, even in the absence of documentary evidence, that our ancestors were more ignorant of the useful arts than the Atlantic Coast Indians, who, less cultured than the prehistoric mound builders and the Pueblo races of the West, were in possession of rude, but often ornamental, utensils made of baked clay and sand.

Primitive potteries for the production of earthenware on a small scale were operated in the provinces at an early period, but as only the coarser grades of ware were needed by the simple inhabitants of a new country, no extended accounts of them appear to have been written by the older historians. As early as the year 1649, however, there were a number of small potteries in Virginia which carried on a thriving business in the communities in which they existed; and the first Dutch settlers in New York brought with them a practical knowledge of potting, and are said to have made a ware equal in quality to that produced in the ancient town of Delft. Prof. Isaac Broome, of the Beaver

Falls Art Tile Works, informs me that the remains of an old kiln fire-hole, saved from the ravages of time by being thoroughly vitrified, still exist a mile or two below South Amboy, N. J. This is a relic of the earlier pottery ware made on this continent, and was most probably established by the Dutch to make stew-pans and pots.

Dr. Daniel Coxe, of London, proprietor, and afterward governor, of West Jersey, was undoubtedly the first to make white ware on this side of the Atlantic. While he did not come to America himself, he caused a pottery to be erected at Burlington, N. J., previous to the year 1690, through his agent, John Tatham, who, with Daniel Coxe, his son, looked after his large interests here. It is recorded that in 1691 Dr. Coxe sold to the "West New Jersey Society" of London, consisting of forty-eight persons, his entire interests in the province, including a dwelling-house and "pottery-house" with all the tools, for the sum of £9,000 sterling. We are indebted to Mr John D. McCormick, of Trenton, N. J., for calling attention to the following reference to this pottery, supposed to have been written about 1688, in the Rawlinson manuscripts in the Bodleian Library at Oxford, England: "I have erected a pottery att Burlington for white and chiney ware, a greate quantity to ye value of £1200 have beene already made and vended in ye Country, neighbour Colonies and ye Islands of Barbadoes and Jamaica where they are in great request. I have two houses and kills with all necessary implements, diverse workemen, and other servants. Have expended thereon about £2000."* It is possible to gain some idea of the nature of this "white and chiney ware" by examining the statements of Dr. Plot, a contemporary, who published his Natural History of Staffordshire two years before, as quoted by the late Mr. Llewellynn Jewitt, in his Ceramic Art of Great Britain: "The greatest pottery they have in this country is carried on at Burslem, near Newcastle-under-Lyme, where for making their different sorts of pots they have as many different sorts of clay . . . and are distinguish't by their colours and uses as followeth:—

"1. *Bottle clay*, of a bright whitish streaked yellow colour.

"2. *Hard fire clay*, of a duller whitish colour, and fully intersperst with a dark yellow, which they use for their *black wares*, being mixt with the

"3. *Red Blending clay*, which is of a dirty red colour.

"4. *White clay*, so called it seems, though of a blewish colour, and used for making yellow-colour'd ware, *because yellow is the lightest colour they make any ware of.*" †

* MS. Rawlinson, c. 128, fol. 396.

† Page 97, vol. 1, London, 1873.

In 1685 Thomas Miles made a white "stone-ware" of pipe-clay procured at Shelton. A few years after this, it is said that a potter named Astbury made "crouch" and "white stone" ware in the same town, on which he used a salt glaze.* It is probable that the "chiney" of the Burlington pottery was in reality a cream-colored ware or a white stone-ware somewhat similar to that made about the same time in England. It is not unlikely that the clay was brought from South Amboy, as Dr. Coxe owned considerable land in that vicinity. This clay has since been extensively employed in the manufacture of fine stone-ware.

Among the immigrants of the seventeenth century were potters who had learned their trade in the mother country, and Gabriel Thomas, who came from England, states in his Description of Philadelphia, published in 1697, that "great encouragements are given to tradesmen and others. . . . Potters have sixteen pence for an earthen pot which may be bought in England for four pence."

It has heretofore been generally believed that the first bricks used in the erection of houses in this country were imported, but it is more than probable that by far the greater proportion were made here. Daniel Pegg and others manufactured bricks in Philadelphia as early as 1685, and within a few years after that date numerous brick-yards were in operation along the shores of the Delaware. Many residences throughout the country, particularly in certain sections of Pennsylvania, were built of brick early in the eighteenth century. The cost of importing these supplies from England and transporting them to the rural districts, far removed from tide-water, would have been prohibitory. That building-bricks were extensively manufactured here previous to 1753 is indicated by a statement of Lewis Evans, of Philadelphia, who wrote to a friend in England in that year: "The greatest vein of Clay for Bricks and Pottery begins near Trenton Falls, and extends a mile or two in Breadth on the Pennsylvania side of the River to Christine; then it crosses the River and goes by Salem. *The whole world cannot afford better bricks than our town is built of.* Nor is the Lime which is mostly brought from White Marsh inferior to that wherewith the old castles in Britain were formerly built."

When burned, as formerly, in "clamps," the bricks formed their own kiln, piled on edge, a finger's breadth apart, to allow the heat to circulate between. Those which came in direct contact with the wood-fire in the kiln were blackened and partially vitrified on the exposed ends; while the opposite extremities,

* This was made of tobacco-pipe clay mixed with flint, and was superior to anything produced before.

which were farthest from the heat, were only partially burned, and consequently too soft for external use. The other bricks in the kiln which were uniformly surrounded by heat came out red. To utilize all the bricks produced, the black ends of the former were laid outward in the wall, thus combining utility with ornamentation. Many of the older houses were constructed in this manner. An old building on the Brandywine, near West Chester, erected in 1724, was built of bricks made on the property from clay found in the vicinity. The structure was considered an imposing one in its day, and the walls are still standing, in an excellent state of preservation. The annexed drawing will convey a good idea of the manner of laying the bricks in a wall where the red and black varieties were used, known as the Flem-

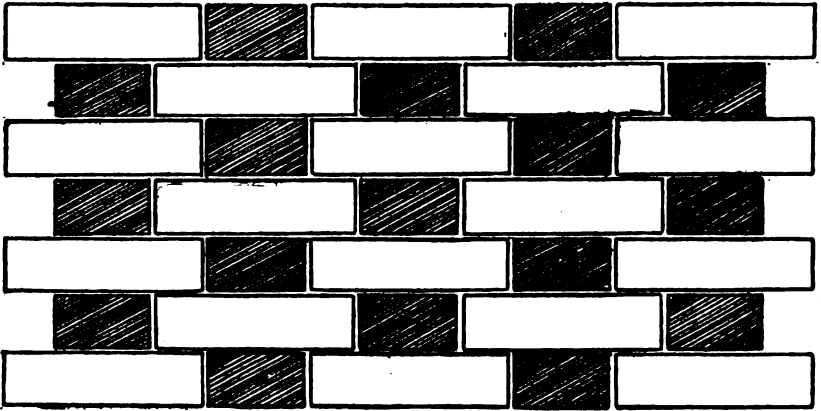


FIG. 1.—FLEMISH BOND.

ish bond, in which the binders and stretchers alternated, each layer breaking joints with that above and below.

Roofing tiles were also manufactured in this country more than a hundred years ago. Plain tiles were made of ordinary brick clay, about five eighths of an inch in thickness and six and a half to seven inches wide by thirteen to fourteen in length. They were fastened to the rafters of the roof by means of a clay knob or hook at the upper margin of the under side. The surfaces were broadly and shallowly grooved to carry the water off. Such tiles are still found in the *débris* of an old smithy which was built in 1799 at Cope's Bridge on the Brandywine. Other examples, made in Lancaster County, Pa., one of which bears the date 1769, have recently come to light.

A stone-ware factory was started in New York, at "Potter's Hill," near the "Fresh-water Pond," back of the City Hall, in or about 1735, by John Remmey, who came from Germany. The business passed through three generations, all of the same name,

and was discontinued about 1820. Later on, John Remmey, great-grandson of the above, moved to South Amboy, N. J., and established a pottery there.

Previous to the middle of the last century, and before the manufacture of porcelain had been attempted in America, Eng-

lish potters were using china clays procured in this country. Mr. Jewitt, in his *Ceramic Art of Great Britain*, informs us that a patent was taken out in 1744, by Edward Heylyn, of the parish of Bow, in the county of Middlesex, merchant, and Thomas Frye, of the parish of West Ham, in the county of Essex, painter, for the manufacture of china-ware; and in the following year they en-

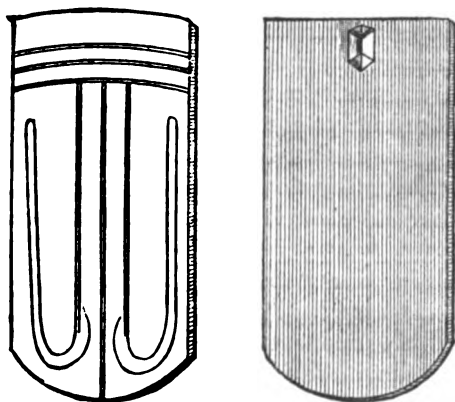


FIG. 2.—AMERICAN ROOFING TILES (eighteenth century).

rolled their specification, in which they state that the material used in their invention "is an earth, the produce of the Chirokee nation in America, called by the natives unaker."

In 1878 and 1879, Mr. William H. Goss, proprietor of the extensive porcelain works at London Road, Stoke-on-Trent, contributed to the *English Pottery and Glass Trades' Review* a series of notes on Mr. Jewitt's work. In December of the former year he wrote: "The specification of this patent is of startling interest. Who would have thought, until Mr. Jewitt unfolded this document to modern light, that the first English china that we have any knowledge of was made from American china-clay? Let our American cousins look out for, and treasure up lovingly, specimens of the earliest old Bow-ware after learning that." Then follows the specification in full as given by Mr. Jewitt, and Mr. Goss continues: "This 'unaker,' the produce of the Chirokee nation in America, is decomposed granitic rock, the earth or clay resulting from the washing being the decomposed felspar of that rock. It is curious that it should have been imported from among the Chirokees when we had mountains of it so near as Cornwall; unknown, however, to any 'whom it might concern' until Cookworthy discovered it twenty-four years later than the date of the above patent." William Cookworthy was acquainted with American clays as early as 1745, for in a letter to a friend dated fifth month, thirtieth, of that year, quoted by Mr. Jewitt, he writes: "I had lately with me the person who hath discovered the china-

earth. He had several samples of the china-ware of their making with him, which were, I think, equal to the Asiatic. 'Twas found in the back of Virginia, where he was in quest of mines; and having read Du Halde, discovered both the petunse and kaulin. 'Tis the latter earth, he says, is the essential thing towards the success of the manufacture. He is gone for a cargo of it, having bought the whole country of the Indians where it rises. They can import it for £13 per ton, and by that means afford their china as cheap as common stoneware. But they intend only to go about 30 per cent under the company."

We must not conclude from this statement that the ware which Cookworthy had seen had been made in America. It is much more probable that the pieces were some of those produced at the Bow works, within the year that had just passed, from the recently discovered American materials.

Not until 1769 was there any serious attempt made to manufacture fine porcelain on this side of the water. In Watson's *Annals of Philadelphia* we find the brief statement that "the desire to encourage domestic fabrics gave rise, in 1771, to the erection of a flint-glass manufactory near Lancaster, by which they hoped to save £30,000 to the province. A china factory, too, was also erected on Prime Street, near the present Navy Yard, intended to make china at a saving of £15,000." In a foot-note the author adds: "This long row of wooden houses afterwards became famous as a sailors' brothel and riot-house on a large scale. The former frail ware proved an abortive scheme." Mr. Charles Henry Hart, of Philadelphia, made the interesting discovery, a few years ago, of some old advertisements in the newspapers of that time which threw considerable light on this early American enterprise, and he has kindly placed at my disposal the results of his investigations. The first of these announcements, which appeared in the latter part of the year 1769, is as follows:

NEW CHINA-WARE.—Notwithstanding the various difficulties and disadvantages, which usually attend the introduction of any important manufacture into a new country, the Proprietors of the China Works, now erecting in Southwark, have the pleasure to acquaint the public, they have proved to a certainty, that the clays of America are productive of as good Porcelain, as any heretofore manufactured at the famous factory in Bow, near London, and imported into the colonies and plantations, which they will engage to sell upon very reasonable terms; and as they purpose going largely into this manufacture as soon as the works are completed, they request those persons who choose to favor them with commands, to be as early as possible, laying it down as a fixed principle, to take all orders in rotation, and execute the earliest first; dealers will meet with the usual encouragement, and may be assured, that no goods under Thirty Pounds' worth, will be sold to private persons out of the factory, at a lower advance than from their shops. All workmen skilled in the different branches of throwing, turning, meddelling, moulding, pressing, and painting, upon application to the Proprietors, may

depend on encouragement suitable to their abilities; and such parents, as are inclined to bind their children apprentices to either of these branches, must be early in their application, as only a few of the first offering will be accepted, without a premium; none will be received under twelve years of age, or upwards of fifteen. All orders from the country, or other provinces, inclosed in letters, post paid, and directed to the CHINA PROPRIETORS in Philadelphia, will be faithfully executed, and the ware warranted equal to any, in goodness and cheapness, hitherto manufactured in, or imported from England.

Subsequently the proprietors advertised for bones, offering twenty shillings per thousand "for any quantity of horses or beeves shank-bones, whole or broken, fifteen shillings for hogs, and ten shillings for calves and sheep (a proportionable price for knuckle bones) delivered at the china factory in Southwark"; concluding with the announcement that the capital works of the factory were then completed and in full operation. The projectors of this enterprise were Gousse Bonnin, a foreigner, who had most probably learned his trade at Bow, and George Anthony Morris, of Philadelphia. In January, 1771, they applied to the Assembly for pecuniary assistance, in the form of a provincial loan, the petition being given in full by Colonel Frank M. Etting in his History of Independence Hall. In their address it is stated that the petitioners "have expended great sums in bringing from London Workmen of acknowledged Abilities, have established them here, erected spacious Buildings, Mills, Kilns, and various Requisites, and brought the Work, we flatter ourselves, into no contemptible Train of Perfection." Whether they were successful in securing the loan does not appear, but later in the same year they advertised for zaffer or zaffera, without which they could not make blue ware. In April, 1772, they advertised for apprentices to the painting and other branches, and shortly after for flint glass and "fifty wagon loads of white flint stone." The attempt, however, proved a failure in a financial point, and in the latter year the proprietors made a public appeal for charity for the workmen who had been brought to a strange country and were left without means of support. After running about two years the factory was closed, the real estate was sold, and Bonnin returned to England.

Little is known of the ware made here. The fact that zaffer was used shows that blue decorated ware was made. The Bow works at that period turned out little but blue and white china, as was the case with all of the early English factories, which employed lapis lazuli and zaffer to color beneath the glaze.

The terra-cotta works owned by Mr. A. H. Hews, at North Cambridge, Mass., were founded by his great-grandfather, Abraham Hews, at Weston, Mass., some time previous to 1765. At first only the ordinary household utensils of earthenware were

made and sold in exchange for general merchandise. After several changes in the firm name, the business descended to the present proprietor in 1865, and five years later was transferred to its present location, where it is said that more flower-pots are produced than at any other factory in the world. Here also are made the usual line of fancy garden terra-cotta and a large variety of art pottery for decorators.

Toward the latter part of the last century potteries for the manufacture of earthen and stone ware had become numerous throughout the States. During the Revolutionary period considerable china was imported from India, Holland, and England for the use of the wealthier citizens, but pewter utensils were also much in vogue. The common people used earthenware, generally red pottery, on which the first attempts at decoration were made with yellow slip. Dishes and flower-pots, with pie-crust edge and rude floral designs or dates, were common (see Fig. 17).

Before the beginning of the present century several stone-ware and earthenware potteries were started in Connecticut. In 1791 John Curtis was making a good quality of pottery in Philadelphia from clay obtained where the brewery now stands at Tenth and Filbert Streets, and his name is found in the directory as late as 1811 in the same business. In the former year Andrew Miller also made earthenware in the same town, and continued the business until 1810, when it passed into the hands of Abraham and Andrew Miller, Jr., who carried on the business jointly for about six years. In 1824 Abraham Miller displayed, at the first annual exhibition of the Franklin Institute, "red and black glazed tea-pots, coffee-pots, and other articles of the same description. Also a sample of platinated or lustre pitchers, with a specimen of porcelain and white ware, all of which exhibited a growing improvement in the manufacture, both in the quality and form of the articles." Quoting from the report of the committee: "It is but a few years since we were under the necessity of importing a considerable proportion of this description of ware for home consumption, but since our potters have attained the art of making it equal, if not superior, to the imported, and as cheap, they have entirely excluded the foreign ware from the American market." Miller continued to manufacture a fine grade of earthenware, such as plates, vases, and ornamental flower-pots, until 1858, but we can not discover that he carried the manufacture of porcelain beyond some successful experiments.

John and William Norton established a pottery in Bennington, Vt., in 1793, for the production of red ware, which was discontinued about 1800, when the manufacture of stone-ware was substituted. This ware has been made continuously ever since, the business being now carried on by Messrs. Thatcher and Nor-

ton, the latter a great-grandson of John Norton, one of the founders.

A "china" manufactory existed in Philadelphia ninety-one years ago, but very little is known regarding it. A friend has recently shown me a letter, dated August 14, 1800, written by a merchant of that city to his wife, who was then visiting in New Jersey, in which occurs the following interesting bit of news: "On account of a man being murdered at the *China Factory* on Monday evening last, a block maker by trade, a number of the same profession, with Rope makers and Carpenters, assembled and on Tuesday evening began to pull down the buildings; they continued at their work till yesterday mid-day,—it was pulled down by Ropes in spite all the Squires and Constables that could be collected—say every house, only leaving the Chimneys standing." The writer, an ancestor of the present owner of the letter, was in business at that time near Fourth and Chestnut Streets, and we are led to infer that the factory was somewhere in that neighborhood. All white ware at that time was known as *china*, and the term was evidently applied to queen's-ware—certainly not porcelain.

Paul Cushman had a stone-ware factory at Albany, N. Y., in the first decade of this century, and some examples of his ware are now in the possession of Mr. S. L. Frey, of Palatine Bridge, N. Y., one of which bears the inscription, impressed on the surface of the jar, and twice repeated around the body, "Paul Cushman Stone Ware Factory 1809 Half a Mile West of Albany Gaol."

In 1812 Thomas Haig, from Scotland, established a pottery in the Northern Liberties, Philadelphia, where he made red and black ware. At the Franklin Institute exhibition in 1825, articles made at this pottery were considered, "in the opinion of the judges, better than goods of the same kind brought from England." The pottery is still operated by Thomas Haig, a son of the founder, who is now in his eightieth year.

Queen's-ware was probably first made in the United States about 1800. Eight years later the Columbian pottery, on South Street, between Twelfth and Thirteenth, in Philadelphia, was

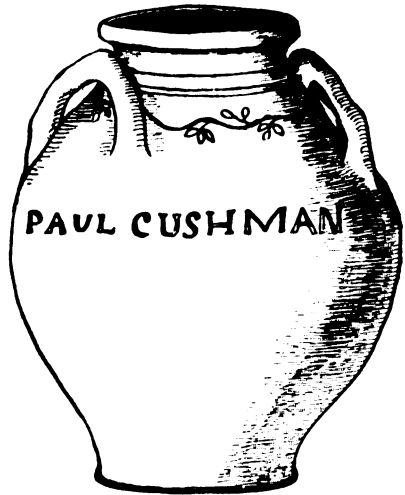


FIG. 3.—ALBANY STONE-WARE. (Collection of Mr. S. L. Frey.) Made about 1809.

turning out white ware which was claimed to be equal in quality and workmanship to the best made in Staffordshire. Two years later Captain John Mallowney, brick-maker, was operating the Washington pottery on Market Street, west of Seventeenth; and in the files of the *Aurora* or *General Advertiser*, published in Philadelphia in 1810, this factory advertised red, yellow, and black coffee-pots, tea-pots, pitchers, etc., and called special attention to the decorating branch, artists being employed who were prepared to put any device, cipher, or pattern on china or other ware at the shortest notice.

Daniel Freytag was making in Philadelphia, in 1811, a finer quality of china-ware than had yet been produced in the United States. It was made of various colors, and was embellished with gold and silver; and in 1817 David G. Seixas manufactured an imitation of the Liverpool white crockery from native American clays with great success, continuing the business until 1822.

Porcelain was made in New York city early in this century, probably by Dr. Mead. How long this factory was in operation is not known, but it is believed that a fine grade of ware was made there from American materials. A vase over a foot in height, of excellent body and exceedingly white glaze, is preserved in the Franklin Institute. This was "finished in New York in 1816," and is supposed to have been made at that factory. It is entirely devoid of gilding or coloring, and is made in two parts, held together by a screw and nut, after the French manner.



FIG. 4.—PORCELAIN VASE. New York, 1816.

In 1823 Henry Remmey, a brother of John Remmey, the last proprietor of the New York stone-ware factory, which was closed about 1820, came to Philadelphia and embarked in the same business, which is now continued by a great-grandson, Mr. Richard C. Remmey, who now owns the largest stone-ware works in the United States. Here are manufactured fire-bricks of superior quality, and chemical stone and porcelain ware of every description, some of the vessels having a capacity of two hundred to five hundred gallons. In addition to these specialties, the factory produces a large line of household utensils, and the business has grown to such proportions that the ten large kilns are taxed to the utmost.

No considerable progress was made in the manufacture of porcelain in the United States until William Ellis Tucker, of Philadelphia, began his experiments. From 1816 to 1819 his father, Benjamin Tucker, had a china shop on the south side of Market Street, at No. 324, then between Ninth and Tenth Streets, near



FIG. 5.—TUCKER & HEMPHILL'S CHINA FACTORY. Philadelphia, 1832-'33. (From a vase owned by Mrs. Thomas Tucker.)

where the new post-office building now stands. During this period Mr. Tucker built a small decorating kiln in the rear of his store for the use of his son, who employed much of his time in painting the imported white china and firing it in the kiln. These attempts were at first only partially successful. He then commenced experimenting with different clays, which he procured in the vicinity of the city, to discover the process for manufacturing the ware itself. These experiments resulted in the production of a fair quality of opaque queen's-ware. He then directed his attention to kaolin and feldspar, and finally succeeded in discovering the proper proportions of these ingredients, in combination with bone-dust and flint, necessary for the production of an excellent grade of natural or hard porcelain. Having secured a translucent

body of great hardness, density, and toughness, capable of withstanding extreme changes of temperature, he first seriously began the manufacture of the ware for the market in the year 1825. The old water-works, at the northwest corner of Schuylkill-Second (Twenty-first) and Chestnut Streets, were obtained from the city, where the necessary glazing and enameling kilns, mills, etc., were erected. His first attempts were fraught with many difficulties. While the body and glaze of the earlier productions were good, the workmanship and decoration were inferior. The decoration consisted generally of landscapes painted roughly in sepia or brown.

In 1828 Thomas Hulme was admitted to the business, but retired in about one year. During this period great improvement was made in decoration, the best productions being painted with floral designs in natural colors. A number of pitchers made during that period are marked "Tucker & Hulme, China Manufacturers, Philadelphia, 1828," the only pieces from this factory known to have been signed.



FIG. 6.—TUCKER CREAMER. Sepia decoration.



FIG. 7.—HEMPHILL VASE. (Collection of Hon. James T. Mitchell.)

William Ellis Tucker died in August, 1832, but previous to this Judge Joseph Hemphill had put some money in the enterprise, and continued to carry on the business after his partner's death.

Messrs. Tucker & Hemphill purchased the property at the southwest corner of Schuylkill-Sixth (now Seventeenth) and Chestnut Streets, where they erected store-houses and three kilns, and greatly increased the producing capacity of the factory. In 1832 they appealed to Congress for the passage of a tariff law which would afford them protection from foreign competition.

Mr. Thomas Tucker superintended the business after the decease of his brother, which was carried on in the name of Judge Hemphill for about three years, but in 1835 the latter entered

into negotiations with a company of Eastern gentlemen, and sold the factory to them shortly after. In 1837 the factory was leased to Thomas Tucker, who continued the manufacture of fine porcelain for about one year, when it was permanently closed. Under the direction of Judge Hemphill, who had become interested in the subject while abroad, great improvements were made in the body of the ware as well as in the glazing and ornamentation. French porcelain was selected as the model after which the Tucker & Hemphill china was patterned, and skilled artists were brought from France to decorate the ware. Pitchers and vases were sometimes decorated with painted portraits of Revolutionary heroes; two of the former, with likenesses of Washington and Wayne, are still preserved. The later productions of this factory were greatly superior to anything produced in the United States before. They were characterized by smoothness of paste, beauty of coloring, and richness of gilding—indeed, it is said that the amount of gold consumed in the decoration of this ware was so great as to cause a considerable pecuniary loss to Judge Hemphill. It is a matter of regret that the limit of this article is not sufficiently elastic to permit a more extended review of this interesting factory and description of some of its many beautiful productions which have been recently brought to light.

Isaac Spiegel, one of Tucker & Hemphill's workmen, started in business for himself in Kensington, Philadelphia, about 1837. He made Rockingham black and red ware of excellent quality, including mantel ornaments, such as figures of dogs and lions. Some of the machinery was moved to his pottery from the Hemphill factory

on its closing, and he secured many of the molds which had been used for making ornamental porcelain pieces. In 1855 Mr. Spiegel retired from active business, and was succeeded by his son Isaac, who carried on the works until 1879. In 1880, John Spiegel, a brother of the latter, resumed the business, and is at



FIG. 8.—HEMPHILL VASE (with painting of a shipwreck).

the present time engaged in burning magnesia for the drug trade.

About the time that Tucker first placed his new ware on the market a factory for the production of a somewhat similar commodity was erected at Jersey City, presumably by Frenchmen. Later, under the title of the American Pottery Company, cream-colored, white, Parian, and porcelain wares were made here. In 1842 an exhibit of embossed tea-ware, jugs, and spittoons was made by this company at the Franklin Institute, the specimens of Parian with blue ground and raised ornamentation in white being especially praiseworthy. After several changes in proprietorship the business passed into the hands of Messrs. Rouse & Turner in 1870, and the name of the factory was altered to the Jersey City Pottery. Mr. John Owen Rouse came from the Royal Derby Works about forty years ago. Mr. Turner died in 1884, leaving the former sole proprietor. The plant at present consists of four kilns, one of which has an interior diameter of nineteen and a half feet, and numerous large buildings for manufacturing and storage purposes. Here are now made large quantities of white granite ware in table and toilet services and decorative designs, a specialty of the factory being porous cups for telegraphic uses, of which fully five thousand are produced every week.

After the year 1840 the number of potteries in the United States multiplied rapidly. About that time Samuel Sturgis was making, in Lancaster County, Pa., in addition to earthen and stone ware, clay tobacco-pipe bowls, which he molded after the French designs in the form of human heads. These were glazed in yellow, green, and brown, and supplied largely to the tobacconists of eastern Pennsylvania. In 1843 there were one hundred and eighty-two potteries in that State alone, few of them, however, of any importance, whose aggregate productions amounted to \$158,000. In 1890 there were only about eighty potteries in the same State, a falling off of more than half. This diminution in number does not by any means indicate a decadence of this industry, because the establishments of half a century ago were mostly scattered through the rural districts and were insignificant affairs, producing only the coarser and cheaper grades of crockery. Such potteries have almost entirely disappeared, while those of to-day manufacture, for the most part, the finer qualities of earthen, white granite, and porcelain wares. At the present time there are over five hundred potteries in the United States, not including architectural terra-cotta and tile works, of which some twenty-five are in Trenton, N. J., and about the same number in East Liverpool, Ohio.

An exhibit of Rockingham was made at the Franklin Institute in 1846 by Bennett & Brother, of Pittsburg, which was

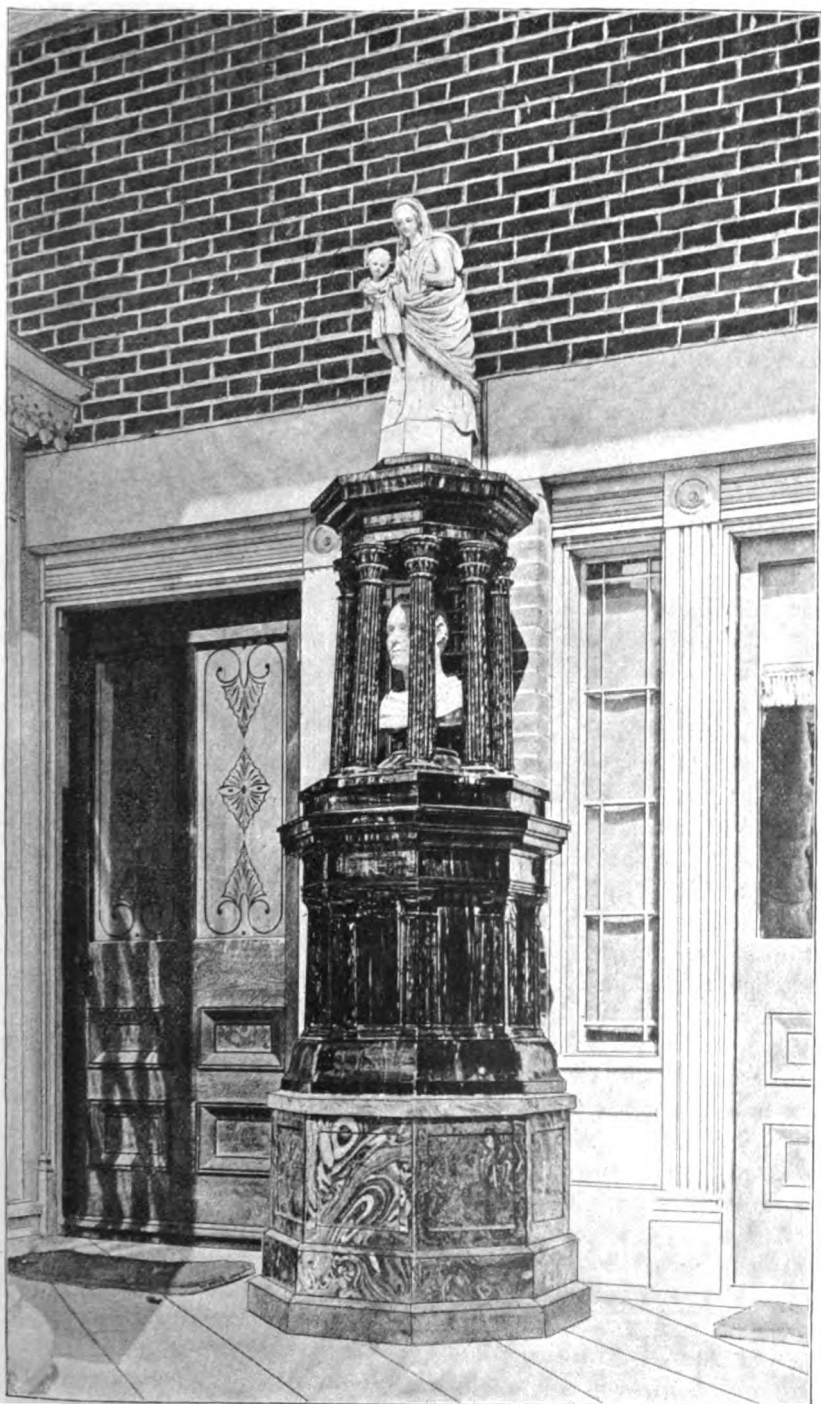


FIG. 9.—ROCKINGHAM MONUMENT. Made at Bennington, Vt., 1851.

pronounced by the judges superior to the English ware. A "tortoise-shell" pitcher, eight-sided, with human head molded in relief under the mouth, which is still in the cabinet of the Institute, was awarded a silver medal.

Messrs. Alanson Potter Lyman and Christopher Weber Fenton embarked in the manufacture of yellow and Rockingham ware in Bennington, Vt., about 1847. Three years later they commenced making white ware. Their workshop was known as the United States Pottery. In 1851, or the year following, Mr. Fenton had a large monumental piece of Rockingham made, ten feet in height, in which was placed a life-sized Parian bust of himself surrounded by eight glazed columns, the work being surmounted by figures of a woman and child in Parian. This was modeled by Daniel Greatbach, formerly connected with the Jersey City Pottery. The base of the monument is made of several varieties of clay mixed together, having the appearance of unpolished marble. It stands at present on the porch of Mr. Fenton's former residence in Bennington, having been first placed on exhibition at the New York Crystal Palace in 1853, with other productions of this factory, including a group of "patent flint enameled ware," which was probably analogous to the so-called majolica of the present day. Common china, white granite, and Parian were made here extensively. A limited amount of soft porcelain was produced also, but chiefly in small ornamental figures and statuettes. These, like the Parian pieces, were often copied from old English works. A graceful pitcher of the latter ware, in the collection of the writer, is molded with white figures in relief on a dark-blue "pitted" ground, and is almost an exact, though enlarged, reproduction of a sirup-jug from the Dale Hall Works, England. The jasper-ware of Josiah Wedgwood was also imitated in Parian. The art of the American potter had not yet reached that point where competition and public demand stimulated originality in body, design, or decoration. Fig. 10 shows a group of pieces made at the Bennington factory between 1850 and 1855. In the center may be seen a large Rockingham figure, beneath which are two small mantel ornaments of artificial porcelain. The central pitcher above the dog and the two small pitchers to the right are white granite, decorated in gold. The three remaining pitchers and the small vase are Parian, with ornamentation in relief.

The United States Pottery was closed in 1857, and two years later Mr. Fenton, with Mr. Decius W. Clark, his former superintendent, went to Peoria, Ill., and there established a manufactory of white and granite wares. After a period of three years this experiment proved a financial failure, and the factory passed into other hands. At present it is being successfully operated by the

Peoria Pottery Company, which makes a fine grade of similar goods.

Messrs. Haughwout, Dailey & Co. had a decorating establishment in New York city in 1853, and employed a hundred hands in painting French china for the American market. Mr. James Carr, who came to this country in 1844, worked for the American Pottery Company of Jersey City until 1852, when he went to South Amboy, and there established a pottery for the manufacture of



FIG. 10.—WARE MADE BY LYMAN & FENTON.

yellow and Rockingham wares. In October, 1855, he started a pottery in New York, under the firm name of Morrison & Carr, where table-services in opaque china, white granite, and majolica were made. He directed his efforts toward the attainment of higher standards, and his experiments resulted in the production of some artistic pieces of porcelain and faience, excellent both in design and execution; but as there was little demand for this class of goods at that time, these attempts were discontinued. In 1888, owing to the close competition of out-of-town manufacturers, the New York pottery was closed and the factory torn down. Mr. Carr has recently built, on the premises in West Thirteenth Street, several large stores, the rentals from which, he claims, yield him better returns than potting.

The Philadelphia City Pottery of Mr. J. E. Jeffords, who came from the New York establishment of Messrs. Morrison & Carr about 1860, includes two distinct factories, one of which turns out a high grade of Rockingham, yellow, and white-lined blue ware, while the adjoining workshop produces an excellent variety of white and decorated earthenware for toilet and table use. In Rockingham some of the old English designs are reproduced, such as the "Toby" ale-jug and the cow creamer. A few years ago a more elaborate ornamentation was attempted in the paint-

ing of bird and floral subjects above the glaze, but this was soon discontinued owing to the expense. Printing from copper plates is extensively practiced here at the present time, and competent artists are employed to apply the gold in pleasing devices to the rich dark glazes which characterize the better grades of ware produced. Mr. Jeffords has fully equipped his factories with the most approved modern appliances, and is one of the most progressive and successful of our modern potters.

Mr. Alexander William Robertson started a small pottery in Chelsea, Mass., in the year 1866, for the manufacture of brown ware such as was made in Great Britain, and of lava-ware similar to that of Germany. Two years afterward, Mr. Hugh Cornwall Robertson, a younger brother, was admitted to partnership in the business, the firm name being A. W. & H. C. Robertson, when the production of brown ware was discontinued and the manufacture of plain and fancy flower-pots was substituted. In the following year porous cones or filters of a high grade were made for chemical purposes. In 1872 James Robertson, a practical potter of wide and varied experience in Scotland, England, New Jersey, and New York, and recently from the East Boston pottery, joined his sons, the firm name being changed to James Robertson & Sons, when work of a more pretentious character was undertaken. A red bisque ware, in imitation of the antique Grecian terra-cottas and Pompeian bronzes, was first produced in 1875. The factory adopted the name of the Chelsea Ceramic Art Works. The red ware was characterized by a remarkably fine texture and smooth finish, the clay being peculiarly adapted to the faithful reproduction of the graceful classic forms, the fine polished grain offering an excellent surface for the most minute carving, showing the engraved lines as perfectly as on wood. In 1876 a pleasing effect was obtained by polishing the red ware with boiled linseed oil. On a few spherical vases thus treated, Mr. F. X. Dengler, the talented young sculptor who afterward died at the age of twenty-five, modeled from life, in high relief, choosing child and bird forms. The firm also received the benefit of advice from a number of capable artists, including, John G. Low, G. W. Fenitz, and others. For lack of public support this branch of the art was abandoned. The next venture was the Chelsea faience, introduced in 1877, which is characterized by a beautiful soft glaze. This ware soon attracted the attention of connoisseurs, and carried the firm to the front rank of American potters. The decoration consists of floral designs, either made separately by hand and sprigged on, or carved in relief from clay laid directly on the surface while moist. Some beautiful effects were produced by hammering the surface of the faience before burning, and afterward carving sprays of flowers in relief in clay applied to the

surface. This modeling was executed by Miss Josephine Day, a sister-in-law and pupil of Mr. H. C. Robertson, and by Mr. Robertson himself. Being done by hand from original designs, no duplicates were produced. On some of the hammered vases the designs were cut into the surface and filled in with white clay, forming a mosaic, the bases of the vessels being colored buff, which offered a pleasing contrast through a semi-transparent

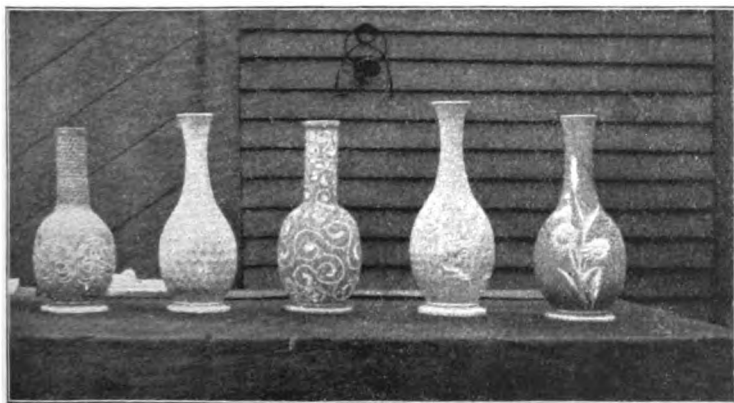


FIG. 11.—INLAID, HAMMERED AND EMBOSSED POTTERY. (Chelsea Ceramic Art Works.)

glaze. About the same time a variety of faience known as the Bourg-la-Reine of Chelsea was produced, after the discovery of the process of painting on the surface of the vessel with colored clays and covering with a transparent glaze, on the principle of the Limoges faience.

Mr. James Robertson died in 1880, after a long and useful life, at the ripe age of seventy years. The firm continued under the same name, and in 1884 A. W. Robertson retired from the business. In that year the remaining partner, Mr. Hugh C. Robertson, discovered a stone-ware somewhat resembling Parian in appearance, possessing a hard, vitrified body, which he worked into a variety of artistic forms.

From this time Mr. Robertson directed his efforts toward solving the secret of the famous Chinese *Sang de bœuf*, and after four years of sacrifice and patient investigation his labors were crowned with success. This discovery is the exact treatment necessary to produce the true ox-blood red, which with the Chinese was the result of accident rather than an established art. The body is the true stone, perfectly water-proof, and capable of resisting as high a degree of heat as any known ware. The forms of the vases are simple, with curving outlines, and entirely devoid of ornamentation which would tend to impair the beauty of color, which is that of fresh arterial blood, possessing a golden

lustre, which in the light glistens with all the gorgeous hues of a sunset sky. In experimenting to obtain the blood-red of the *Sang de bœuf*, varieties were produced of a deep sea-green, "peach-blow," apple-green, mustard-yellow, greenish blue, maroon, and rich purple. Specimens of this ware have been secured by a number of prominent collectors throughout the United States, but the demand for works of this character being limited, the remaining examples which were produced still rest on the dusty shelves in the Chelsea workshop. The history of the discovery of this process is a repetition of the old story of genius.



FIG. 12.—PLAQUE REPRESENTING SPRING. (Designed by H. C. Robertson, 1879.)

After twenty-four years of devotion to art, Mr. Robertson finds himself unable to prosecute the work further, and for over two years the fires have not been lighted in his kilns. It is difficult to explain the apparent indifference of Americans to works of artistic merit which emanate from their countrymen.*

* Since writing the above, word comes to us that a company has been incorporated under the name Chelsea Pottery U. S., and date July 17, 1891, of which Mr. Hugh C. Robertson will be the manager.

Thus far we have attempted to review, in the briefest manner, some of the earlier potteries in the United States. The space at command has only permitted the bare statement of facts relating to the condition of the ceramic industry down to the period just preceding the Centennial Exposition of 1876. It has not been possible to refer to many establishments whose record would be necessary to a full history of the development of this art. Let us now see what progress has been made in the methods employed in this country down to the present time.

The potter's wheel used well into the present century was a clumsy and primitive affair. It consisted of a perpendicular beam, generally about two feet in height, surmounted by a circular disk a foot or so in diameter. At the lower extremity of the beam or axis was a horizontal wooden wheel, four feet across, possessing four inclined iron spokes which extended from the beam to the rim of the wheel, which the workman pushed around with his feet. He sat on a framework behind the wheel, while in front were piled the lumps of clay to be manipulated.

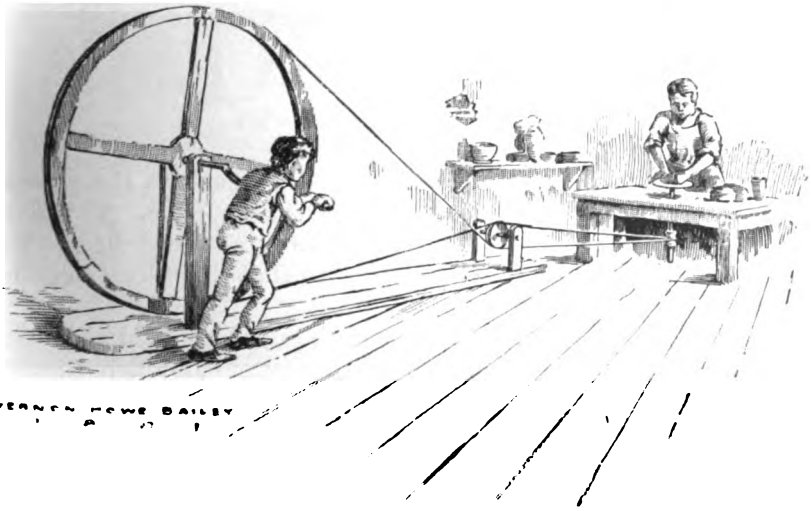


FIG. 13.—OLD-FASHIONED "THROWING WHEEL."

A great advance was made in potters' machinery a few years later, or in the first quarter of the present century, when the "throwing wheel" was introduced into the more prominent factories. This was composed of a plate or disk which was revolved by means of a belt which passed around two spindles and extended to a large vertical wheel operated by a crank in the hands of a second person. This upright wheel usually measured four, five, or more feet in diameter, depending on the rate of velocity desired; the larger the wheel, the greater the speed to be attained.

The revolving plate at which the potter sat was often ten or more feet from the crank-wheel, and the apparatus was therefore cumbersome, besides requiring the services of an extra hand. This contrivance was a great improvement over the old method of turning, as it secured uniformity of motion and enabled the operator to devote his entire attention to his work. This style of wheel, in time, was superseded by the more simple form which is worked by a treadle with the left foot of the operator, and is still used in many of the smaller potteries. The subjoined engraving

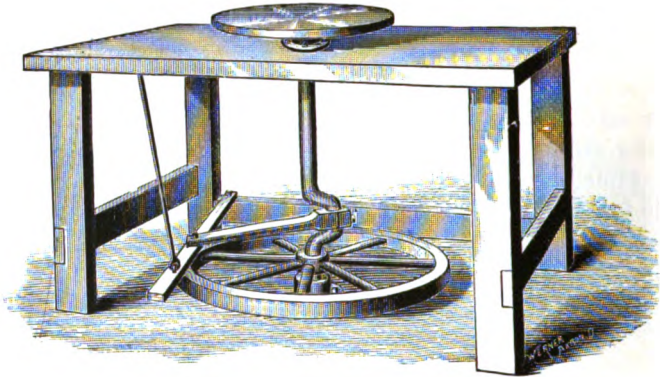


FIG. 14.—“KICK WHEEL (now used).”

represents one of these “kick” wheels, as made at the present time by Messrs. Taplin, Rice & Co., of Akron, Ohio. This firm also manufactures a power-wheel such as is now operated in the larger factories, which is so constructed that the velocity can be regulated by a foot-lever.

The old methods of grinding and mixing clays by hand have given place to improved mechanical processes. In olden times it was customary for one or two men to manipulate the clay, which was placed in a square tank sunk in the floor, with a wooden shovel or paddle. Now this work is performed much more effectively and rapidly by special machinery known as “blungers,” “pug” and “grog” mills, etc. Some of the improved grinding mills have a capacity of twenty-five tons or more per day, and the agitating and mixing machines perform the work of many men.

I have in my possession a drawing of the old-fashioned slip kiln used by Messrs. Tucker & Hemphill in 1832. This consisted of a long horizontal brick fire-box, at one end of which were built three partitions or pans, one after the other. In these the slip was poured, and flues passing around the sides furnished the heat necessary to dry the clay to the proper consistency. This drying process was necessarily a slow one. The contents of the pan nearest the fire-box would be ready for removal first, and

the others in succession. A recent invention has simplified this process very materially. This device is a clay press consisting of a series of sacks in which the slip is placed. The moisture is forced through the bags by strong pressure, and the clay is ready for use. Mr. A. J. Boyce, of East Liverpool, Ohio, has recently perfected an improved hydrostatic press, which is being introduced into many of the more progressive factories throughout the country. The illustration will convey a clear idea of the clay

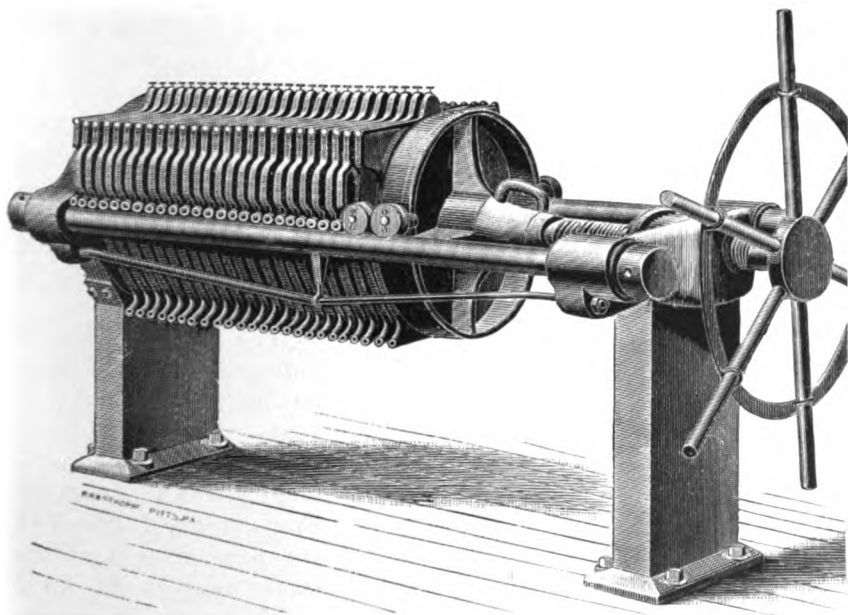


FIG. 15.—THE BOYCE CLAY PRESS, WITH TWENTY-FOUR CHAMBERS.

press used in reducing the slip to a workable mass. In each chamber is placed a sack made of ten-ounce Woodberry duck, which, if of the proper quality, will last some time. The moisture is pressed through the fabric, and the clay, on removal, is ready for manipulation.

“Jiggers” and “jollies” now greatly facilitate the manufacture of circular and swelled vessels, such as jars, jugs, crocks, cuspidors, and umbrella jars. A “jigger” is a machine which carries a revolving mold, in which the clay is shaped by a former, which is brought down into the mold and held in place by means of a lever. We give here an illustration of one of the jiggers made by Mr. Peter Wilkes, of Trenton, N. J. *A* is the jigger-head or receptacle in which the mold is placed, which is screwed fast to the revolving spindle. *B* is a stationary iron column on which the frame or sleeve *C* slides up or down. *D* is an iron fork

which prevents the frame *C* from turning. *E* is the former or profile which shapes the interior of the vessel. The lever or pull-down, above the horizontal bar *F*, gives a transverse motion, and forces the former toward the side of the mold. 1 and 2 are adjustable collars which are fastened by screws; 1 regulates the

distance to which the collar or frame *C* must be lowered to give the proper thickness to the bottom of the vessel, while 2 acts as a stop to prevent the frame from being thrown up too high.

A "jolly" is a somewhat similar contrivance, consisting of a table on which is a revolving mold with a single or double pull-down.

The construction of pottery kilns has changed but little in the past fifty years. The glaze kiln of the Tucker & Hemphill factory was made on the French plan. It possessed six fire-boxes and the same number of flues, eight inches in width, which passed through solid walls and met in the center. Besides the central space there were two circular passages, one extending around the circumference of the kiln and another midway between this and the center. Modern kilns are generally made about fifteen to sixteen and a

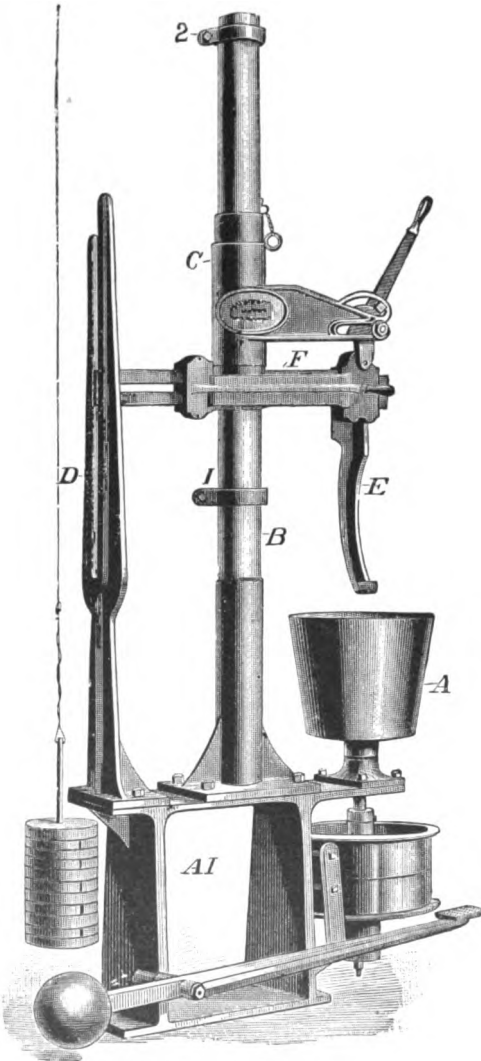


FIG. 16.—"JIGGER."

half feet diameter inside, and measure about the same in height to the crown, with usually ten fire-boxes. In some of the Western kilns slight modifications have been made in the latter for the employment of natural gas, which is used instead of coal.

Until quite recently each establishment made its own sagers or fire-clay boxes in which the ware is burned, but now they are made in large numbers by machinery and supplied to the trade by the Trenton Terra-Cotta Company at a very low price. In the manufacture of earthenware formerly, "cockspurs" were used to separate the pieces when placed in the kiln. These were small four-pointed objects of clay formed somewhat like the old-fashioned caltrop, three of the arms resting on the lower vessel while the upper supported another above. Three spurs being used, it is evident that the upper surface of the lower piece would show nine marks after coming out of the kiln, where the points tore away the glaze, as in old Delft plates. The bottom of the upper vessel would show three. "Cockspurs" and "cones" were superseded by "pins" and by "triangles" and "stilts," having three horizontal arms, equidistant, with double points projecting upward and downward. These were for some time made by hand at the factories where they were to be used, but recently they have been made in assorted sizes by machinery, and sold to potters more cheaply than they could be made by hand.

Labor-saving machines have greatly simplified the work of

the potter. Steam power has to a great extent taken the place of hand and foot power in running wheels, lathes, "jiggers," and "jollies." Steam grinding-mills, "blungers," sifters, and clay-presses now grind, sift, mix, dry, and prepare the clay for the workman. There are many other problems to be solved, however, in order to still further cheapen the production of utilitarian articles. The committee appointed by the United States



FIG. 17.—SLIP-DECORATED PIE DISH. ALLENTOWN, PA., 1826.

Potters' Association to investigate the subject of potters' machinery, in their report presented at the convention held in 1890, used the following language: "We think we can see in the distance a cloud no bigger than a man's hand, which we trust will speedily increase to such proportions that the industry will feel the outpouring of benefits such as have not entered into the imagination of the potter's mind. We require only to get the

American mechanical mind turned in the direction of our need, and we will not fear for the future of our business.

"We would urge upon the manufacturing potters that more thought be given to this subject, and that they come in closer touch with the best machinists of our several centers. Let the practical machinist know our need. Much can be done; much must be done if we expect to hold our own. And what is our own? The American market for American manufacturers."

NOTE.—Several of the illustrations which appear in this paper are from pen-and-ink drawings made from the original porcelains by Mr. Vernon Howe Bailey, a student at the Pennsylvania School of Industrial Art, Philadelphia.

[To be continued.]

PROGRESS AND PERFECTIBILITY IN THE LOWER ANIMALS.

By PROF. E. P. EVANS.

WHAT we call institutions are only organized and hereditary instincts, and are common to man and the lower animals. The original social character of animals, which forms the basis of their institutions, is also the quality that renders them capable of domestication. Man simply takes advantage of this quality, and turns it to his own account by bringing the animal into his own domestic circle and service and making it a member of his household.

In birds, for example, the conjugal instinct is remarkably strong, or, as we would say in speaking of human relations, the institution of marriage, either in its monogamous or polygamous form, is firmly established and highly developed, and forms the foundation of a well-ordered domestic and social life.

The paternal fox trains his young with as much care and conscientiousness as any human father; the beaver constructs his habitation with the foresight of a military engineer and the skill of an experienced architect; the bee lives in well-regulated communities, forms states, and founds colonies; and the ant not only cultivates the soil, plants crops, gathers in the fruits of his labor and stores them for future use, and keeps other insects as domestic cattle, but shares also the vicious propensities and domineering disposition of man, waging war on creatures of his own species and holding his prisoners as slaves.

These habits or customs have the same origin and character in the lower animals as in man, being in both cases products of evolution and undergoing modifications from generation to generation. Animal, not less than human, societies are governed by

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RECENT ADVANCES IN THE POTTERY INDUSTRY.

BY EDWIN ATLEE BARBER.

THE DEVELOPMENT OF AMERICAN INDUSTRIES SINCE
COLUMBUS. XI.

THE revelations of the Centennial Exhibition set our potters to thinking and stimulated them to greater competition. Never before was such an impetus given to any industry. The best productions of all nations were sent here and exhibited beside our own modest manufactures, and it was only too apparent that America had been left behind in the race. Up to that time there had been a few sporadic instances of attempts at originality, but comparatively little had been accomplished of a really artistic nature. The existence of a true ceramic art in this country may be said to have commenced with the fair of 1876, because greater progress has been made within the fifteen years which have elapsed since that important event than during the two centuries which preceded it. Let us see what rapid strides have been made in this period.

At the United States Pottery in Bennington, Vt., was a young man, Mr. L. W. Clark, son of the superintendent, Mr. Decius W. Clark, who, on the closing of that factory, accompanied his father to Peoria, Ill., and remained with the firm of Fenton & Clark for about two years, when he left to enter the army. In 1875 he went to Boston, and, in partnership with Mr. Thomas Gray, assumed control of the New England Pottery. This establishment was founded in 1854 by Mr. Frederick Meagher, who made Rockingham and yellow ware. It was afterward taken by Mr. William H. Horner, from whom the plant was purchased by the present proprietors, who now produce the usual lines of useful services in cream-colored and white granite ware. For the past five years

they have been making a decorated product in colored bodies, to which they have given the name "Rieti" ware. This is a semi-porcelain, finished and decorated chiefly after the Doulton, Adderley, and Worcester methods. They also make true hard porcelain of an admirable quality, and their goods are characterized by an artistic style of decoration and excellence of glaze, their mazarine blue and "old ivory" finish being especially praiseworthy. The decorating branches are under the direct supervision of Mr. J. W. Phillips, who originates and engraves many of the best designs used in their printing processes. Most of their shapes are utilitarian rather than ornamental, but they have succeeded in imparting to these a grace of outline and delicacy of coloring which render them objects of great beauty. Their chocolate-jugs, *jardinières*, and cuspidors compare very favorably with the imported wares, after which they are to some extent patterned. Of the few purely decorative forms which they have attempted, a semi-porcelain vase, twenty inches in height, made in 1889, is particularly meritorious. This is artistically painted in natural colors on raised paste, the top and base being in solid, dead gold. Mr. Bands, of the Royal Worcester Works, England, was the artist.



FIG. 18.—SEMI-PORCELAIN VASE.
New England Pottery Company, 1889.

The Ott and Brewer Company, of Trenton, N. J., now operates the factory which was built by Messrs. Bloor, Ott & Booth, in 1863. Mr. J. Hart Brewer, president of the company, entered the firm in 1865, and, being an

artist himself of considerable ability, soon made his influence felt in the improvement of methods and elevation of standards. Until 1876 the chief products of this factory consisted of white granite and cream-colored ware. At the Centennial Exhibition the company made a display of a series of artistic Parians which had been designed mainly by Mr. Isaac Broome, an American artist of remarkable versatility and great promise. Of these special pieces,

probably the most noteworthy are a bust of Cleopatra and a vase with modeled figures of base-ball players.

The first attempts in the manufacture of "Belleek" egg-shell china were made by Mr. Brewer in 1882, in conjunction with Mr. William Bromley, Jr., but these early trials were not entirely satisfactory. Encouraged by partial success, however, Mr. Brewer induced Bromley to send for his father, William Bromley, and his brother, John Bromley, who, with two or three other hands, came over in the following year from the Belleek factory in Ireland. Mr. William H. Goss, of Stoke-on-Trent, invented this body some thirty years ago, at which time the elder Bromley was acting as his manager. Messrs. David McBirney and Robert Williams Armstrong were then attempting to make first-class ceramic goods at their recently established manufactory in the village of Belleek, county of Fermanagh, Ireland. Mr. Armstrong induced Bromley to take a number of Mr. Goss's best workmen to Ireland and introduce the egg-shell porcelain there. The ware produced at that factory has since become world-famous, being characterized by extreme lightness of body and a beautiful, lustrous glaze.

The ware now manufactured by the Ott and Brewer Company is made entirely from American materials, and is a vast improvement over the body and glaze first introduced by the Bromleys eight years ago. In the rich iridescence of the nacreous glaze it is fully equal to the original Belleek; in delicacy of coloring and lightness of weight it is even superior. A dozen cups and saucers, making twenty-four distinct pieces of the ordinary size, almost as thin as paper, weigh just one pound avoirdupois, or an average of only two thirds of an ounce each. A large variety of forms of this porcelain are produced, in both ornamental and useful designs. The larger vases are usually simple in outline and of the same comparative lightness as those of smaller size. They often possess pierced necks, feet, and handles, and are elegantly decorated in enamels, gold relief, and chasing.

A triumph of the potter's skill is a Belleek ostrich-egg bonbon-box, in two segments, which is exquisitely perforated or honey-combed over its entire surface. We can not here reproduce more than one or two examples of these beautiful fabrics. One is a



FIG. 19.—BELLEEK VASE.
Ott and Brewer Company.

large vase of the "Bourne" pattern, decorated in raised gold and colors. The shape is graceful and the decoration is exceedingly artistic (Fig. 19).

In addition to art porcelains, this factory produces a great quantity of granite ware and opaque china, in dinner, tea, and toilet sets, which are both print-decorated and hand-painted. A *jardinière* of white granite, which we here figure, is a refined example of artistic decoration in quiet tones.

One of the most extensive establishments in the Eastern States is that of the Willets Manufacturing Company of Trenton, N. J.



FIG. 20.—WHITE GRANITE JARDINIÈRE. Ott and Brewer Company.

The present proprietors, Messrs. Joseph, Daniel, and Edmund R. Willets, three brothers, succeeded to the business in 1879. The factory was erected in 1853 by William Young and Sons, who at first made Rockingham and common ware. At the Centennial Exhibition William Young's Sons made a display of crockery and porcelain hardware trimmings, at which time the plant included only four kilns. The business has since grown to such an extent, under the present management, that there are now thirteen large ware kilns besides those used for decorating. The products from these works include sanitary earthenware, plumbers' specialties, white and decorated pottery, opaque china, white granite, and art porcelain. A specialty in dinner and toilet services is underglaze decoration on white bodies.

After the Ott and Brewer Company had perfected the body and glaze of their Belleek ware and got it well under way, William Bromley, Sr., went with the Willets Manufacturing Company and instructed them in the process. The manufacture of

white egg-shell ware, to which they are constantly adding new designs, is another specialty of these works, and the company is now competing successfully with the Dresden and other foreign factories in supplying white art porcelain to decorators. In form their pieces are graceful and artistic, one of which is represented in Fig. 22.

They also employ a number of competent artists to decorate their art goods, many of which are reproductions of the characteristic shell and coral forms of the Irish works. Fig. 23 represents a large Belleek vase with open-work handles and chrysanthemum decoration in delicate tints on an ivory, gold-stippled ground.

The Ceramic Art Company, of which Mr. Jonathan Coxon, Sr., is president and Mr. Walter S. Lenox secretary and treasurer, was established in Trenton in 1889. The first named gentleman became superintendent at the Ott and Brewer Company's works after Bromley left, and the latter was formerly in charge of their decorating department. Here they learned the processes of manufacturing Belleek. Although they have at present but one ware kiln

and two decorating kilns, they are rapidly making a name by their constantly increasing patterns, many of which are exquisitely conceived and show the touch of a thorough artist. They have procured the best designers and painters that can be found and employ both the overglaze and underglaze processes in decorating. Their egg-shell ware is also furnished in the white to decorators. Fig. 24 shows one of these undecorated pieces, a graceful lily-shaped cup and saucer. In addition to vases and table pieces, they

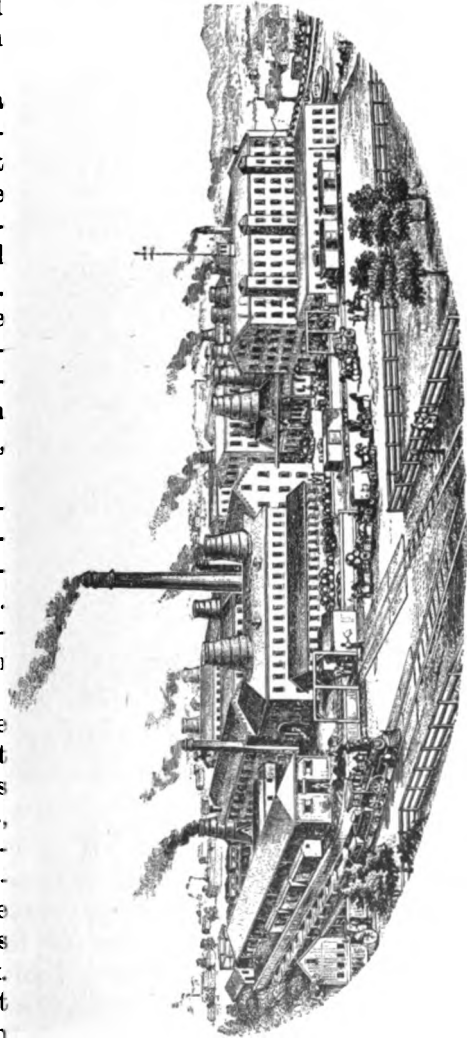


FIG. 21.—WORKS OF THE WILLETS MANUFACTURING COMPANY, TRENTON, N. J.

make many fancy patterns, such as thimbles, inkstands, parasol-handles, menu slabs, and candelabra.

The Phoenixville (Pa.) Pottery, Kaolin, and Fire-brick Company was organized in 1867, and a few years later was succeeded by Messrs. Schreiber & Co., who made yellow and Rockingham ware, and terra-cotta ornaments and wall-pieces. Heads of hounds



FIG. 22.—SHELL AND CUPID PITCHER—BELLEEK.
Willels Manufacturing Company.

and stags in several sizes, and large boars' heads, were made extensively here, and twenty years ago were in demand for decorating the interiors of public-houses. Many of these may still be seen in country taverns. These were considered works of considerable artistic merit when first produced. The antlers and horns of stags and antelopes were made separately and afterward inserted. Messrs. Beerbower & Griffen took the pottery in 1877 and commenced the manufacture of

white granite. In 1879 the firm name was changed to Griffen, Smith & Co., and in the following year the manufacture of "Etruscan" majolica was added. From 1880 to 1890 the factory produced a good grade of white and decorated china, mostly in table services and toilet sets. Through their majolica and "stucco" productions, however, the firm became more widely known, and within the past few years they have made many decorative pieces in shell and dolphin patterns, after the Irish Belleek forms. Since the fire, which destroyed a large portion of the works recently, the manufacture of majolica has been discontinued. Mr. Smith withdrew from the firm in 1889 and erected levigating mills at Toughkenamon, Pa., near which place are large beds of kaolin. The firm style was then changed to Griffen, Love & Co.

As early as 1882 experiments were commenced in the manu-

facture of hard porcelain, and a series of sample pieces were made for the New Orleans Exhibition. The quality and designs of these trial pieces were creditable, and the experiment has shown that this factory is capable of producing true porcelain of a high order. One of the New Orleans pieces, a pitcher of thin semi-transparent body, was also made in white earthenware, glazed and gilded, the latter of which is reproduced in Fig. 25. It is in the shape of a canteen, the mouth representing the head of a Continental soldier. The raised designs are flesh-colored, on a solid gold ground. The three-cornered hat is black. Mr. Scott Callowhill, an English artist of ability, was employed for a while in modeling and painting, but recently left, to accept a position with the Providential Tile Works of Trenton.

At the beginning of the present year a change was made in the proprietorship, and a new company has been incorporated, under the title of the Griffen China Company, which will hereafter make a specialty of fine translucent French china, in plain white table services. The company will also, at an early day, manufacture fancy tiles, under the direction of Mr. A. D. Viton, a practical French potter, formerly at Greenpoint, Long Island. This gentleman has just perfected an improved machine for manufacturing art tiles, and another for making plates.

The Borroughs and Mountford Company commenced business in Trenton in 1879, in what was formerly the Eagle Pottery. Their specialties are vitrified, thin, and hotel china, and underglaze printing on pottery and porcelain. The mechanical application of decorations is the distinguishing characteristic of one line of their art potteries, which, while closely imitating the more expensive methods of hand-painting, enables them to produce highly artistic effects at a greatly re-



FIG. 23.—LARGE VASE—CHRYSANTHEMUM DECORATION. Willets Manufacturing Company.

duced cost. The bold ornamentation of their *jardinières*, umbrella-jars, punch-bowls, and vases, after the Doulton, Royal Worcester, and Adderley methods, bears a striking individuality of its own. Probably their most beautiful pieces are those on which raised gold designs are applied by hand to an exquisite mazarine blue. White tiles of the finest quality, with underglaze blue



FIG. 24.—EGG-SHELL PORCELAIN--THE "ENGAGEMENT" CUP AND SAUCER. Ceramic Art Company.

printed devices, as well as embossed and art tiles, are also made to some extent.

The Greenwood Pottery Company, incorporated in Trenton in 1868, make a specialty of the manufacture of vitrified and translucent china for hotel, steamship, and railway uses. This pottery was established in 1861, under the style of Stephens, Tams & Co. They are also making, at the present time, thin china table ware for domestic purposes, porcelain hardware trimmings, and electrical, telegraph, and telephone insulating supplies. Some years ago they added an art department



FIG. 25.—WHITE-WARE PITCHER. Phoenixville, Pa.

to their extensive establishment, and their decorated productions are characterized by elegance of form, being decorated usually in the Royal Worcester style, with ivory finish and raised gold, silver, and bronze effects. The plant of the company consists of seventeen large kilns, with an annual producing capacity of over half a million dollars.

Among the other important Trenton establishments is that of Messrs. Oliphant & Co., which turns out large quantities of plumbers' sanitary appliances, druggists' and jewelers' supplies. About 1886 the late Mr. Thomas Connolly, a partner in the concern, commenced experimenting in Belleek wares, having been at one time connected with the Irish works. He succeeded in producing some exquisitely thin trial pieces, and demonstrated the fact that these works could manufacture egg-shell ware of the highest grade. The few pieces which were produced, consisting

of small ewers, cups and saucers, were fired in the large kilns with the sanitary ware. For some unknown reason, however, this



FIG. 26.—EWER VASE. Faience Manufacturing Company.

branch of the business was never developed beyond the experimental stage.

The Knowles, Taylor and Knowles Company, of East Liverpool, Ohio, have the largest works in America, their plant covering ten

acres and including thirty-five ware and decorating kilns. The business was started in 1854 by Mr. Isaac W. Knowles and Mr. Isaac A. Harvey, who, with a single kiln, made yellow ware and, later, Rockingham. In 1870 Mr. Knowles, who had purchased the interest of his former partner, was joined by Messrs. John N. Taylor and Homer S. Knowles, and in 1872 they commenced the manufacture of iron-stone china and white granite ware. The business of the company has had a phenomenal growth, and at the present time they employ about seven hundred hands in the production of extensive lines of white granite and vitreous hotel china, which they supply to the trade.

The Faience Manufacturing Company, of Greenpoint, Long Island, produces white ware artistically decorated and, we believe, a limited quantity of porcelain. The pieces are of ornamental rather than of useful shapes. The engraving (Fig. 26) represents a ewer vase from this factory with open-work handle and molded figure of bird. It is unfortunate that the secrets of this factory should be guarded so jealously as to deprive us of all knowledge concerning the processes employed and the qualities of the wares produced. Repeated inquiries have failed to elicit any reply.

To Mr. Thomas C. Smith, of Greenpoint, Long Island, belongs the honor of being the first American manufacturer who has been successful in placing upon the market a true hard porcelain as a commercial article. His experiments, which extended over a number of years, first commenced to bear fruit about 1865, when he perfected a plain white ware, and a year afterward he commenced to decorate his goods. The Union Porcelain Works, of which Messrs. Thomas C. Smith and C. H. L. Smith are the proprietors, have produced many decorative pieces in addition to their staple productions of true porcelain table ware.

This porcelain is composed in body of clay, quartz, and feldspar. It is fired in biscuit at a low temperature, in the second story of the porcelain kiln, using for its baking the surplus heat passing away after having done its greater work in the first story or gloss-kiln where the glazing is done. At this first burning the ware receives only sufficient fire to make it properly fasten together in form. It is quite fragile, easily broken with the fingers, and porous, not having yet had sufficient heat to commence vitrification. In this condition it is what is termed porcelain biscuit, and is ready for the glaze-tub. The glaze of porcelain is composed of the same material as the body, and so compounded that those elements which are soonest fluxed by the influence of the heat are in greater proportion than they are contained in the body. The porous, low-fired biscuit is dipped into a liquid puddle of glaze. Upon being withdrawn its porosity quickly absorbs the excess of water, leaving a dry coating of the glaze compound,

which was held by the water in suspension, upon the surface of the piece. This piece of porous biscuit covered with glaze is now cleaned of glaze upon its foot, or that part upon which it rests, to prevent its sticking or burning fast to the clay "sagger" or firing case; otherwise the glaze on the bearing parts would, at the time of flowing, form a cement, fastening the piece and the sagger together. The pieces are placed separately in the saggars. The heat in firing hard porcelain is carried to such a high degree that the ware touches the point of pliability, almost the melting-point. At this point of heat the body is vitrified; at the same time the glaze, from its slightly softer composition, is melted into the body of the ware, producing a hard, vitreous, and homogeneous material properly known as true, hard porcelain. This is the process used at Sèvres, Meissen, Berlin, and elsewhere.

The earthenware method is just the reverse of this. The body is composed of much the same materials as a porcelain body, but differently compounded, and it is baked in biscuit at the first firing at a greater heat than is required for porcelain biscuit, and receives during that first burning the greatest heat to which it is subjected in the entire process of manufacture. The glaze is composed partly of the same materials as compose the body, with the addition

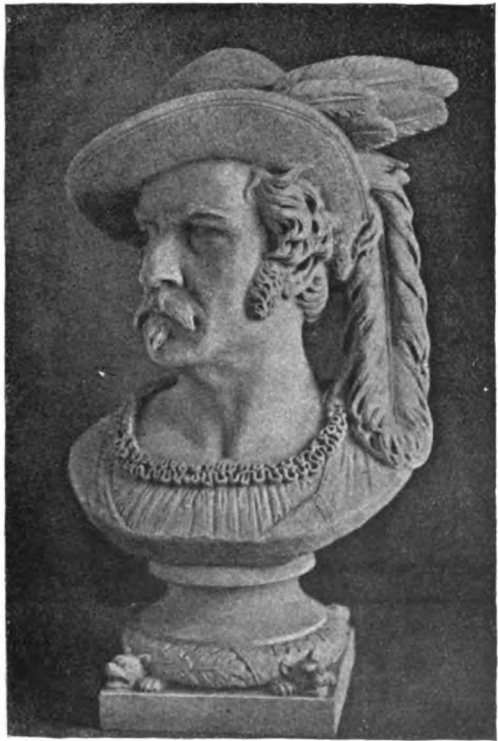


FIG. 27.—BUST OF EDWIN FORREST AS WILLIAM TELL.
Union Porcelain Works.

of oxide of lead and boracic acid, which latter, being soft, fluxes in the fire, enabling the glaze to flow at a low heat. It is fired the second time in the gloss-kiln at a lower temperature than it has previously been fired in biscuit. This results in flowing the soft glaze over the surface of the ware, making substantially a lead-glass film or coating upon the surface of different compounds and materials, not homogeneous, not a part of the

ware by being fused into the body as in porcelain. The body and glaze being thus in constant antagonism to each other, produce sooner or later what is technically called "crazing" or cracking of the enamel, for the reason that the body is one thing, produced

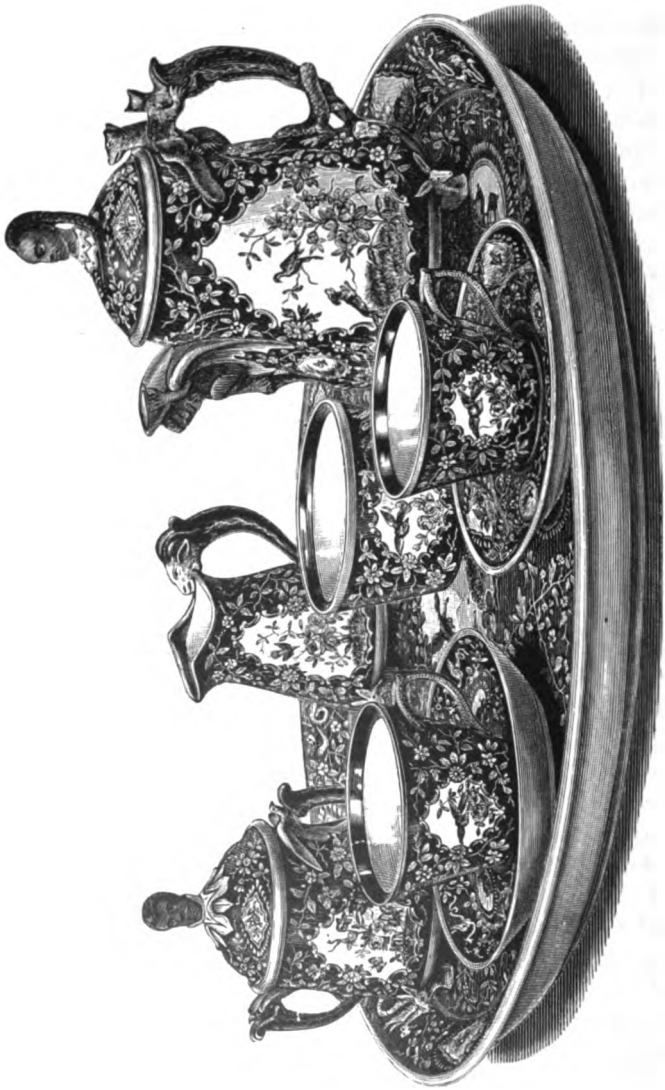


FIG. 28.—TÊTE-À-TÊTE SET. Union Porcelain Works.

at a higher temperature, and the glaze another, produced at a lower temperature, and not as in porcelain, body and glaze produced at the same time, and at the last and greatest heat.

Fig. 28 shows a *tête-à-tête* set, with head of Chinaman on the cover of the tea-pot, a negro's head on the sugar-bowl, and goat's head on the creamer.

The Union Porcelain Works also manufacture largely hard porcelain insulators and hardware trimmings.

The exquisite fabrications of the Greenpoint works have done much to dispel that unreasonable prejudice which until recently condemned all American productions, of whatsoever merit.

Beautiful as are many of the delicate productions of the potter's skill which are made in molds or by the aid of machinery, clay is a material which yields the most subtle and satisfactory results to the direct touch of the human hand. While printing processes are excellent in their way and indispensable for cheapness, where large production is an element to be considered, they are inadequate to give that breadth and freedom of treatment which constitute true artistic decoration.

While visiting the Centennial, Miss M. Louise McLaughlin, of Cincinnati, was strongly impressed with the beauty of the then novel faience from the Haviland potteries of Limoges, and on her return home she determined to discover, if possible, the processes of decoration. Her experiments, partially successful, extended over a period of nearly three years, and in April, 1879, she gathered around her twelve ladies who were interested in decorative art, and the Pottery Club, which has since exercised such an important influence on the ceramic industry in Cincinnati, was then organized, Miss McLaughlin being elected president and Miss Clara Chipman Newton secretary. Experiments were continued at some of the city potteries, where red, yellow, and white wares were made. On the unburned ware colored clays were applied in the manner of oil paints, and some satisfactory results were obtained.

The ceramic display of Japan at the Philadelphia Exhibition was, more than any other perhaps, the artistic impulse that inspired the venture which resulted in the establishment of the Rookwood Pottery in 1880 by Mrs. Maria Longworth Nicholls. Her experiments were continued at this factory, which, through the liberal patronage of Mr. Joseph Longworth, her father, was furnished with the necessary means for carrying it on until its productions had found a market and it could stand financially alone.

The ware produced here is a true faience, and while the shapes employed are mainly reproductions or variations of classic Greek forms, they possess a marked originality in treatment. The potter's wheel is used as far as possible, on account of giving more freedom and greater variety to the outlines. Mr. Charles Mahar is the only thrower employed at the pottery, and his graceful creations have obtained a world-wide celebrity. The method of casting in vogue is that which consists in pouring liquid clay into plaster molds, which absorb the superabundant moisture from the

adjacent clay. The thin slip is then emptied from the center of the molds, leaving a shell of uniform thickness, which is allowed to stand a while longer before being removed.

The bodies are made of clays found mainly in the Ohio Valley, though samples are being constantly sent to Mr. Joseph Bailey, the superintendent, from all parts of the country. The clays mostly used are a red variety from Buena Vista, Ohio; yellow from Ironton, Ohio; and a whitish or cream-colored clay from Chattanooga—artificially tinted bodies being also used to some extent. The glazing, however, is the most distinctive characteristic of the Rookwood Pottery, which, when applied to the tinted



FIG. 29.—GROUP OF ROOKWOOD VASES.

bodies, produces the effect of rich tones of black, yellow, green, red, brown, and amber, harmoniously blended, of great depth and strength. A number of competent artists are constantly employed in beautifying the wares, the decorations being entirely under-glaze. Mr. Kataro Shirayamadani, a Japanese painter of the best school, is doing some of the finest work in Oriental methods. Mr. A. R. Valentien, Mr. M. A. Daly, and others rank among the best American decorators in their particular lines. The above engraving will give a fair idea of some of the forms of vases produced, but no adequate conception of the great beauty of the glazing can be conveyed in black and white.

It is not generally known that the Rookwood Pottery has produced varieties of ware other than the richly glazed pottery which has recently become so familiar through its exhibition in the prominent art-stores of the country. In the earlier years, commencing about 1881, cream-colored ware, with blue prints of

fishes and reptiles, was made. One of these early plates so decorated is here figured. Yellow ware of the finest quality was also produced ten years ago. The highest achievements in glazing are the so-called tiger's-eye and gold-stone, which glisten in the light with an auriferous sheen and all the changing hues of the rainbow.

The Rookwood Pottery was the first in this country to demonstrate the fact that a purely American art-production, in which original and conscientious work is made paramount to commercial considerations, can be appreciated by the American public; for financially this enterprise has recently proved successful, and under the efficient management of Mr. W. W. Taylor, the enthusiastic president of the company, experiments are being constantly prosecuted to discover new bodies, colors, and glazes. At the present time a new building, with improved equipments, is being erected on the summit of Mount Adams, which, it is expected, will be ready for occupancy before the end of the present year.



FIG. 80.—ROOKWOOD PLATE, PRINTED DECORATION.

Within the past few years other potteries have attempted in Cincinnati to make decorated ware, with varying success. One founded by Mr. M. Morgan produced a faience modeled in low relief, in Moorish designs, and the Avon Pottery commenced the manufacture of a ware somewhat resembling the Rookwood; but both were closed after a brief existence.

The Cincinnati Art Pottery Company, Mr. Frank Huntington, president, was organized in 1879, and for several years confined its work to an underglaze faience after the Lambeth style. Later it made Barbotine ware in applied work, but soon dropped this and turned its attention to a more artistic style of overglaze decoration. For a time the "Hungarian faience" was popular with the purchasing public. We are enabled to give an engraving of examples of this (Fig. 31). The latest style of work produced at this factory is called the "Portland blue faience," which consists

of gold and colored decoration on a dark, rich blue ground, of the color of the famous Portland vase. The name *kezonta* has been adopted to designate the wares made here. The origin of the word is interesting. The trade-mark used was the figure of a turtle, and afterward learning that the Indian name for turtle was *kezonta*, the proprietors added this name to the device which



FIG. 31.—“HUNGARIAN FAIENCE.” Cincinnati Art Pottery Company.

was employed. Pottery in the biscuit and in blue and white glaze has been sold largely to decorators, the forms being generally modifications of the ancient Roman and Greek. It is with regret we learn that this pottery has been recently closed, the stock of ware on hand having been disposed of by auction.

This, in brief, is the history of the industry which in the past few years has made Cincinnati noted as an art center. In the city Art Museum are about eighty pieces of pottery and porcelain, made between 1875 and 1886, commencing with a small porcelain plate, in blue underglaze decoration, which was painted by Miss McLaughlin in the former year and fired at Greenpoint, Long Island. This collection of early experiments also includes a number of interesting pieces made previous to the establishment of the Rookwood Pottery, by its founder, Mrs. Bellamy Storer, then Mrs. Nicholls.

Some original work of high merit is also being done at the Hampshire Pottery of Messrs. J. S. Taft & Co., Keene, N. H. This pottery was started in 1871 for the manufacture of red ware. Lately the firm has been paying particular attention to art specialties, in new and graceful shapes and novel decorations. The ware is a white, opaque body, covered with a variety of effective glazes. About forty hands are employed, nearly half being decorators. Prof. Edward S. Morse, of Salem, Mass., to whom I am indebted for valuable assistance, first called my attention to these productions.

The Chesapeake Pottery, of Baltimore, Md., was started about

ten years ago by Messrs. D. F. Haynes & Co., and was continued without change until 1887, when the style was altered to The Chesapeake Pottery Company, and again, in 1890, to Haynes, Bennett & Co. Mr. Haynes, who is a practical potter of wide experience and an artist and designer of the highest rank, has invented a number of new bodies and produced a wealth of beautiful designs, which, because of the employment of the printing process in decoration, are to-day beautifying the homes of thousands who could not otherwise enjoy the possession of works of artistic merit. Indeed, the engravings, which have been made especially for these productions, possess so much excellence and are so pleasing in their application to graceful forms that they stand as the exception which proves the rule that the best results can usually be obtained without the aid of mechanical processes. Of the many meritorious designs in high grade dinner sets and the one hundred styles of toilet ware in underglaze printing and overglaze decoration made at this pottery, among the most charming is the Alsatian pattern, made in the new Avalon china body, embellished with the heads of peasants, drawn by Mr. Jesse Shepherd, or scenes from Shakespeare, drawn by Mr. A. Master especially for this set, and printed in velum tints. The "Merchant of Venice" set is particularly attractive, in which, in a panel on one side, the trial scene is depicted, where Portia says, "The quality of mercy is not strained—it droppeth as the gentle rain from heaven"; and on the other the scene between Antonio, Bassanio, and Shylock, in which the latter exclaims, "And for these courtesies I'll lend you thus much moneys."



FIG. 82.—"MERCHANT OF VENICE" VASE.
Chesapeake Pottery.

No less pleasing, though of an entirely different character, is the Arundel ware, which is made entirely from American clays. The body possesses no artificial coloring and is thoroughly vitreous, of a rich olive-brown tint and susceptible of fine finish and delicate relief work. Being made entirely of native materials, it has been named after one of the titles and estates of Lord Balti-

more. This body is made into many useful and decorative shapes, such as jugs, *jardinières*, vases, etc. Pieces of this ware may be seen in Fig. 33. In addition to these productions, the Chesapeake Pottery has turned out ornamental flower-pots, Parian cattle-head plaques in high relief, modeled by Mr. James Priestman, of Boston, from studies of typical animals in the noted herd of Mr. Harvey Adams; also two interesting bas-reliefs representing Winter and Summer, in Parian, the latter modeled by Mr. Priestman and the former by an English artist.

The Clifton ware from this manufactory belongs to the majolica family, and is said to equal, if not surpass, in body the famous Wedgwood ware of the same class.



FIG. 33.—“ARUNDEL” WARE. Chesapeake Pottery.

The ivory ware possesses a body of a soft ivory tint, made from native clays, without the addition of coloring either in body or glaze, whose soft grain and texture render it peculiarly adapted for free treatment and tasteful decoration. Medallions in various colored pastes, on bodies of different tints, which are baked at one firing, have been com-

pared favorably with some of the fine wares made at Etruria, the result of years of intelligent study and experiment in American materials. Many other bodies of equal merit have been invented at this factory, but we have not the space to dwell upon them.

No one of our potters has done so much to beautify the wares for daily use in the household as Mr. Haynes, or accomplished more in the direction of elevating and refining the tastes of the masses, which he considers of even greater importance than the production of a few fine pieces which could only be within the reach of the wealthy. That he has succeeded in this laudable effort is amply demonstrated by the extent to which many of his designs have been copied both at home and abroad.

TILES.—The history of the ceramic art in America would not

be complete without a brief review of the manufacture of ornamental tiles and architectural terra-cotta, which, although extending over only about two decades, furnishes an instance of marvelously rapid development.

As early as 1832, or thereabout, plain fire-brick and tile were made by the American China Manufactory in Philadelphia, then operated by Messrs. Tucker & Hemphill. They advertised these products as being "of a superior quality, manufactured in part from the materials of which the china is composed. These have been proved, by competent judges, to be fully equal to the best Stourbridge brick," which have been celebrated for their excellence for nearly a century and a half. The fire-clays of the Stourbridge district have been used for upward of three hundred years by British manufacturers.

The European exhibits of fancy wall and floor tiles at the Philadelphia Exhibition awakened the American ceramists to a full realization of their insignificance in this broad field, and the majority of ornamental tile works in this country have been established since that great industrial event. With the exception of roofing tiles, Americans made there no exhibit of consequence in this department of the fictile art. As early as 1871 or 1872, however, Messrs. Hyzer & Lewellen, of Philadelphia, had been experimenting in geometrical tiling, and I have before me some interesting examples of these early attempts. Their first experiments were directed to the manufacture of encaustic tiles of geometrical shapes—square, diamond, and triangular—with natural and artificially colored American clays, mainly buff, red, and black, the designs being inlaid to the depth of about a quarter of an inch.

While these efforts proved partially successful, the wet clay method employed at that time was unsatisfactory, because the shrinkage was found to be irregular and the pieces came from the kiln of different thicknesses. The next experiments were made by the damp-dust process, which has been employed ever since. The accompanying illustration will show two forms of geomet-

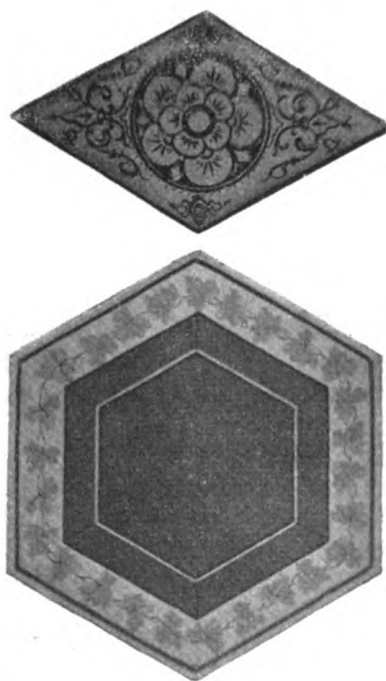


FIG. 34.—SOME OF THE FIRST FANCY AMERICAN TILES. Hyzer and Lewellen.

rical wall tiles which were made previous to 1876. They are plain tiles of yellow clay, of great hardness, the glaze being also hard and entirely free from "crazing," and fully equal to anything of the kind which has since been produced. The hexagonal specimen figured is decorated with painted designs above the glaze, consisting of a green vine on a buff ground, with a red center outlined in black. The lozenge-shaped example is painted with a black device on a lemon ground. Later, several patterns of embossed unglazed mantel tiles, in conventional decoration, were produced, but the manufacture of ornamental tiles was only carried on a short time. At present they make plain geometrical floor tiles of different colored bodies and of exceeding hardness. The clay used is fine and homogeneous, and when burned almost approaches stone-ware. The firm also manufactures fire-brick, dental muffles, and stove-linings.

Furnace tests of the standing-up power of the best-known fire-bricks, instituted by the Second Geological Survey of Pennsylvania in 1876, at Harrisburg, showed that the productions of Messrs. Hyzer & Lewellen were superior, in heat-resisting qualities, to all others that were submitted for examination.

Scarcely two years after the Centennial, Mr. John G. Low, of Chelsea, Mass., who had finished a course of several years in the art schools of Paris, and had recently become interested in the manufacture of pottery, formed a copartnership with his father, Hon. John Low, and immediately commenced the erection of a tile-factory in his native place. Less than a year and a half after the works were started we find the firm competing with English tile-makers at the exhibition at Crewe, near Stoke-on-Trent, which was conducted under the auspices of the Royal Manchester, Liverpool, and North Lancashire Agricultural Society, one of the oldest societies in England. There they won the gold medal, over all the manufacturers of the United Kingdom, for the best collection of art tiles exhibited. This record, probably unsurpassed in ceramic history, serves to illustrate the remarkably rapid development of an industry new in America, but old in the East, and shows the resources at command of the American potter.

In 1883 Hon. John Low retired from the firm, and Mr. John F. Low, son of the founder, became associated with his father, under the style of J. G. & J. F. Low.

Mr. Arthur Osborne, who has designed the majority of the tiles produced here, is a talented artist of the older schools of art, whose conceptions are chaste and classic and possess marked originality.

A novel method was resorted to by Mr. Low in the embellishment of his earlier productions, which he has patented, and which he calls the "natural" process. To secure accurate impressions

of delicate objects, such as grasses, leaves, lace, etc., the article to be represented was placed on the surface of the unburned tile and forced into the clay by means of a press. Such intaglios, plainly showing every small detail of marking, were utilized as molds for forming the raised designs on tiles, which were called "natural tiles."

In the high-relief tiles the undercutting is done by hand after the designs have been stamped in the press. Among Mr. Osborne's designs are ideal heads, mythological subjects, portraits of prominent men, Japanese sketches, and an almost endless variety of animal, bird, and floral studies. His plastic sketches, on a larger scale, are particularly meritorious, some of the most pleasing being a group of sheep in a pasture, a drove of swine, entitled "Late for Dinner," a herd of cows wending their way homeward, and "The Old Windmill." A beautiful conceit is the "Flying Moments," in which three Cupids hover around an hour-glass, one being depicted in the act of winging his way upward (see Fig. 35). These works also make stove tiles, calendar tiles, clothes-hooks, paper-weights, inkstands, and pitchers in plain colors, enameled, and glazed. They at one time also manu-



FIG. 35.—A "LOW" TILE, "THE FLYING MOMENTS." By Osborne.

factured tile stoves. Lately the Lows have been making a specialty of the manufacture of art-tile soda fountains, in which work Mr. Osborne has found a broader field for the exercise of his talents.

The United States Encaustic Tile Works, of Indianapolis, Ind., is the outgrowth of the United States Encaustic Tile Company, which was

organized shortly after the Centennial. Five years ago the present proprietors took charge of the works, and are now making encaustic geometrical and relief mantel tiles. So rapidly has the business grown in the past few years that the plant now



FIG. 36.—PANEL FOR SODA FOUNTAIN. J. G. & J. F. LOW.

organized shortly after the Centennial. Five years ago the present proprietors took charge of the works, and are now making encaustic geometrical and relief mantel tiles. So rapidly has the business grown in the past few years that the plant now

includes six bisque and twelve muffle kilns, which are taxed to their utmost capacity. The clays used for white bodies come from South Carolina and Kentucky, and those for dark bodies are obtained from Indiana, the burning being done by means of natural gas. Miss Ruth Winterbotham, who is at present the principal modeler of this factory, has produced many beautiful



FIG. 87. — "TWILIGHT" TILE.
United States Encaustic Tile
Works. Designed by Miss
Winterbotham.

designs, of which some three and six section panels are probably the most artistic. A series of three mantel panels, representing Dawn, Midday, and Twilight, are particularly deserving of mention, the latter one being shown in the annexed engraving. The method employed in making embossed or relief tiles is that used by all tile works in this country, which was patented by Richard Prosser, in England, in 1840, for making buttons, and shortly after applied by J. M. Blashfield to the manufacture of tiles, called the dust process, which consists in slightly moistening the dry powdered white clay and subjecting it to great pressure in dies containing the designs to be impressed upon them. They are then burned and afterward glazed or enameled in delicate colors. Mr. Robert Minton Taylor, of England, was connected with these works from 1881 to 1883.

The Beaver Falls Art Tile Company, limited, of Beaver Falls, Pa., was organized in 1886 by Mr. Frank W. Walker, the present secretary and treasurer. These works make a specialty of rectangular and circular stove tiles and manufacture largely fine art relief tiles for wainscoting, hearths, and mantel facings. The present designer is Prof. Isaac Broome, a gentleman of rare artistic ability, a thorough potter, and a sculptor of eminence, who became connected with the works in 1890. In 1878 he was appointed a special commissioner on ceramics at the Paris Exposition and, in conjunction with General McClellan, made a thorough study of the ceramic art as it exists abroad. The varied and extensive knowledge which he has acquired through a life of study has especially fitted him for the work upon which he is now engaged.

After leaving the Ott and Brewer Company he went in 1883 with the Harris Manufacturing Company, now the Trent Tile Company, as modeler, and afterward, in 1886, was instrumental in establishing the Providential Tile Works, of Trenton, N. J., and designed many of their best works. Through his influence the Beaver Falls establishment has made, during the past year and a half, rapid strides in the development of decorative tile manufacture. A complete ceramic color scale has been achieved and a series of glazes produced, of soft, rich tones, a most important result obtained being entire freedom from "crazing," which has already given these works a high reputation. Prof. Broome is an indefatigable worker and a prolific artist, his sculptures being characterized by exquisite conception and beautiful execution. While he has produced many more pretentious works, some of his sim-



FIG. 88.—BEAVER FALLS STOVE TILES.

ple designs leave nothing to be desired. One of his most highly admired pieces is a six-inch tile with a Grecian figure (Sappho) leaning on a harp. Prof. Broome has also designed some twelve by twelve inch tiles of great merit which will soon be submitted to the public.

The American Encaustic Tiling Company, of Zanesville, Ohio, is the most extensive establishment of the kind in the United States. It manufactures artistic and encaustic tiles, and has placed upon the market some fine pieces of relief work, twelve by eighteen inches in size, among the subjects of which we have seen some female water-carriers of Grecian type. This factory also

makes an intaglio modeled tile, the effect of which, when filled with glaze, is that of a photograph on a smooth surface of clay. The different depths of the engraving regulate the degree of shading, and portraits of individuals have been executed with great fidelity. It has been mainly through the intelligent management of Mr. George A. Stanbery, the general superintendent, with the assistance of Mr. Karl Langenbeck, the efficient chemist of the company, that such marked success has been achieved. The



FIG. 39.—“SAPPHO.” Beaver Falls Art Tile Company. By Broome.

modeling and casting of the dies are the work of Mr. Hermann Mueller, formerly of Coburg, who studied in the Industrial Academy and Preparatory Art School of Nuremberg, and in the Art Academy of Munich. For geometrical designing of encaustic tiles used in flooring and wainscoting the factory employs several competent architects.

The works were projected in 1875 for the manufacture of floor tiles, but in 1880 enameled tiles were added to the products of the factory, and at the present time eleven large kilns are in operation. The city of Zanesville has recently donated a tract of thirty acres to the company, on which an extensive plant is now being erected which will include twenty-eight kilns, to be operated in addition to the present establishment.

The Trent Tile Company, of Trenton, N. J., established about 1882, is now making dull lustered tiles in *alto-relievo*, which process has been patented. This style of finish forms a striking contrast to the glazed and enameled varieties also made here. Effect-

ive panels for mantel facings, six by eighteen inches, in one piece, are also produced. One of these is a center panel in a pastoral facing, which was modeled by Mr. William W. Gallimore, from a sketch in black and white by an artist of the name of Cooper. The scene represents a shepherd boy playing his pipes to his flock.



FIG. 40.—DULL FINISHED TILES. Trent Tile Company.

The peculiar treatment of this piece, in which the sheep in the foreground are in relief and those in the distance in intaglio, is particularly pleasing. Mr. Gallimore, the present modeler for this company, was in his earlier days connected with the Belleek potteries in Ireland, where he lost his right arm by the bursting of a gun. He afterward modeled for Mr. William Henry Goss, at London Road, Stoke-upon-Trent, where, under the supervision of the latter, he produced some admirable Parian busts, including that of the late Mr. Llewellynn Jewitt, which serves as the frontis-

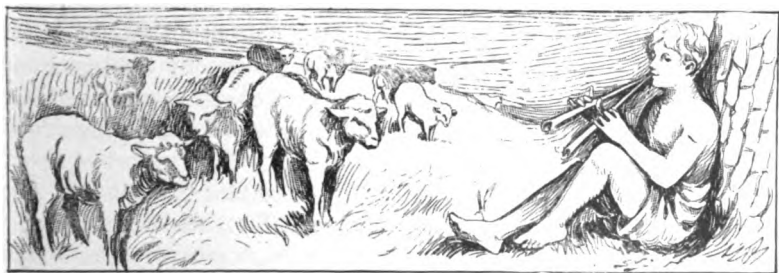


FIG. 41.—PASTORAL PANEL. Trent Tile Company.

piece to the latter's Ceramic Art in Great Britain. Since the loss of his arm, Mr. Gallimore has done his modeling with his left hand, and he has accomplished better work with one arm than he did when in possession of both. He has been with the Trent Company about four years. This company has now six biscuit kilns, and, in addition to the wares made for the general trade, is turning out considerable work of a special nature.

The Providential Tile Works, of Trenton, make glazed tiles, plain and in relief. At one time they experimented in different-colored glazes on the same piece, the raised portions being of a different tint from the ground, and some good results were obtained by this treatment. Underglaze decoration was also employed to



FIG. 42.—TILE PANEL, "INDOLENCE." Providential Tile Works.

some extent formerly, and some fine work in that line was produced, but both of these styles have been abandoned as unsuited to the market. The present designer and modeler is Mr. Scott Callowhill, who came to this country about six years ago from the Royal Worcester Works, England, where, with his brother, Mr. James Callowhill, now of Roslindale, Mass., he had charge of two of the principal decorating-rooms in which the finer class of decoration, in raised paste and gold bronze, was done. He also, while in England, worked for the Doultons, at Lambeth. Some of their newest designs are relief tiles, measuring six by twelve inches, and among their most popular pieces are hunting panels for mantel facings, with such subjects as fighting bucks, stags' heads, sportsmen, and dogs.

One of the most recent applicants for public favor is the Cambridge Art Tile Works, of Covington, Ky., which commenced business in 1887. They are producing high grade enameled and embossed goods of various shapes and in size from one half inch square to six by eighteen inches. The glazes employed are remarkably free from "crazing." The designer and modeler is Mr. Ferdinand Mersman, who studied at the Academy of Fine Arts in Munich. A pair of six by eighteen inch panels, which have just been completed, are examples of exquisite modeling, being copies of Hans Makart's celebrated paintings "Night" and "Morning."

At Anderson, Ind., the Columbia Encaustic Tile Company is

producing inlaid and embossed art tiles, and at other points tile-factories are in operation, but we must content ourselves with this very incomplete sketch of the principal establishments in this country.

In the manufacture of printed, inlaid, and relief tiles, America has advanced rapidly, but in the production of hand-painted art tiles she is sadly deficient. This is a branch of the art that must be developed through the influence of our mechanical art schools, which are paving the way for an early revolution in the ceramic industry in the United States.

Various tile machines have been designed for the manufacture of tiles from dust or semi-dry clay, but we are unable here to reproduce more than one. Fig. 43 shows a screw press, made by Mr. Peter Wilkes, of Trenton, for the Trent Tile Company, and will give an excellent idea of the principle on which the majority of such machines are operated.

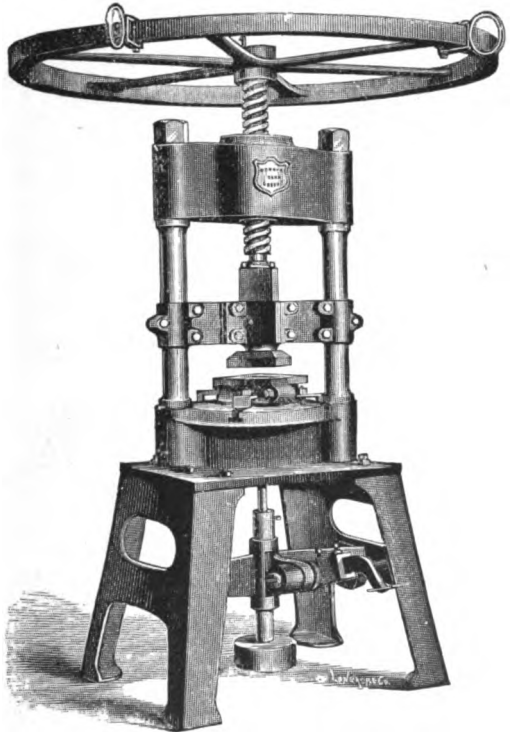


FIG. 43.—THE WILKES SCREW TILE PRESS.

This forms tiles six inches to twelve inches square, the die being placed between the "push-up" and "plunger." It can also be used for making plates, oval dishes, and other ware.

ARCHITECTURAL TERRA COTTA.—It is interesting to note what the fifth edition of the *Encyclopædia Britannica*, published in 1815, contains relative to this subject: "Worlidge, and others after him, have endeavored to excite brick-makers to try their skill in making a new kind of brick, or a composition of clay and sand, whereof to form window-frames, chimney-pieces, door-cases, and the like. It is to be made in pieces, fashioned in molds, which, when burnt, may be set together with a fine red cement, and seem as one entire piece. The thing should seem feasible." And so we shall find that it was.

Terra cotta, the most enduring of all building materials, has

been used to a greater or lesser extent from a high antiquity in continental Europe, and in England terra-cotta trimmings were used in building as early as the fifteenth century. In the United States this material does not seem to have been introduced until after 1850. Experiments were made in this direction in 1853 by

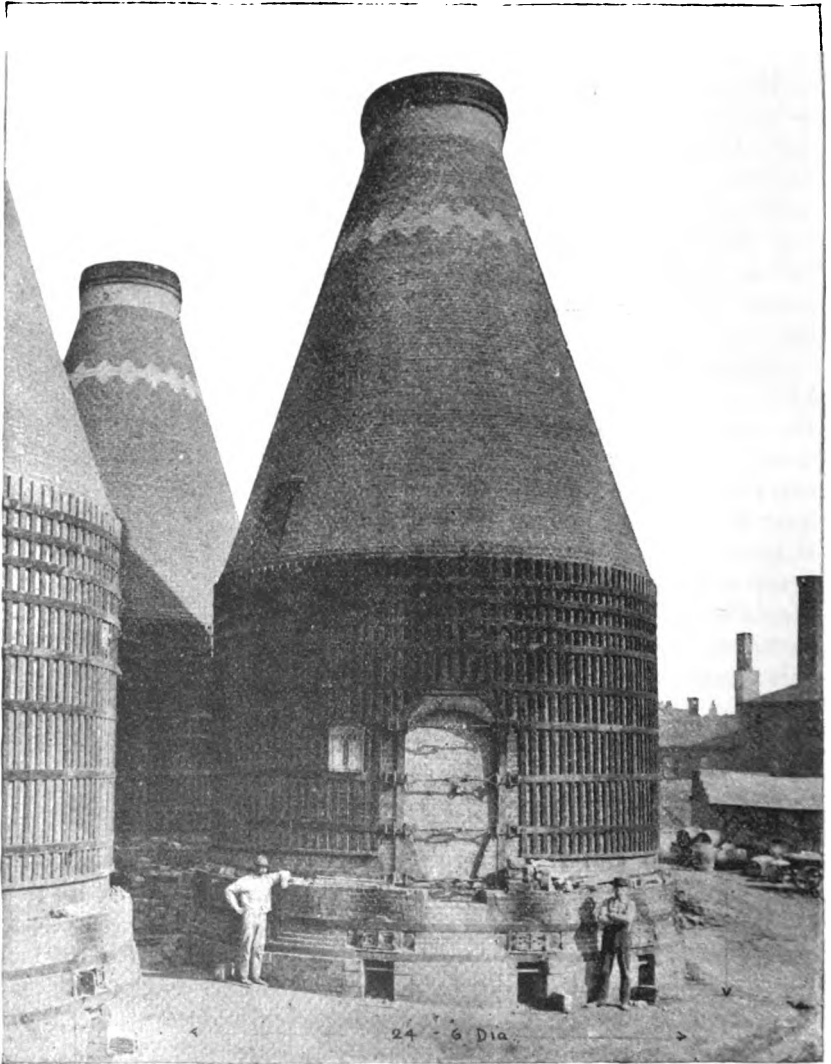


FIG. 44.—THREE KILNS. Perth Amboy Terra Cotta Company.

Mr. James Renwick, a prominent New York architect, but the innovation was not received with favor by builders. In 1870 the Chicago Terra Cotta Company brought over from England Mr. James Taylor, superintendent of the well-known works which

were established by Mr J. M. Blashfield in 1858. By the introduction of the English methods, the Chicago establishment soon turned out better work than had been produced before in the United States.

The Perth Amboy Terra Cotta Company was incorporated in 1879, and at once embarked in the manufacture of large designs for architectural purposes from clay obtained from the neighboring deposits. The plant of this company has expanded so rapidly that at present it includes twenty-two kilns, some of them measuring forty-eight and one third feet in height and twenty-four and one sixth in diameter, which are said to be the largest of the kind on this continent, if not in the world.

The company has in its employ a number of eminent artists in this particular line, and has furnished terra-cotta details for many prominent buildings throughout the country. Of these we may mention Young Maennerchor Hall, Philadelphia; Ponce de Leon Hotel, St. Augustine, Florida; Biological Laboratory, Princeton College; and Central School, Ironton, Ohio. Fig. 45 represents a large panel in a



FIG. 45.

warehouse in Jersey City, and Fig. 46 a bas-relief in the St. Anthony Club House, Philadelphia.

Since about 1880 the demand for architectural terra cotta has rapidly increased, and to-day many manufactories are in operation in various parts of the country. In the latter part of 188



FIG. 46.

the New York Architectural Terra Cotta Company was organized, and the services of Mr. James Taylor secured as superintendent. The works at Long Island City have furnished designs for more than two thousand buildings, scattered throughout the principal cities of the Union. They have lately succeeded in producing a pure white terra cotta, which is said to be fully equal to the red in durability and hardness, and at present are using this latest invention, in combination with buff bricks, in the rebuilding of Harrigan's Theatre, New York. The effect is novel and pleasing. Other architectural terra-cotta works have also been experimenting recently in the same direction, and it is now only a question of a short time when the more perishable marble, as a building material, will be superseded by this more enduring substitute. Having eliminated the red coloring matter from the composition, it would seem possible, by the introduction of other tints, to produce terra cotta in yellow, blue, or any shade desired. The possibilities in this direction appear almost limitless.

The Indianapolis Terra Cotta Company, located at Brightwood, Ind., commenced business under its present management in 1886. Mr. Joseph Joiner, a gentleman of large experience in this field, and a highly qualified architect, superintends the manufacturing department.



FIG. 47.—PANEL IN RESIDENCE OF MR. GEORGE ALFRED TOWNSEND, GAPLAND, ME. NEW YORK ARCHITECTURAL TERRA COTTA COMPANY

In the same year Messrs. Stephens & Leach started a factory for architectural terra cotta in West Philadelphia, and later the firm name was changed to Stephens, Armstrong & Conkling.

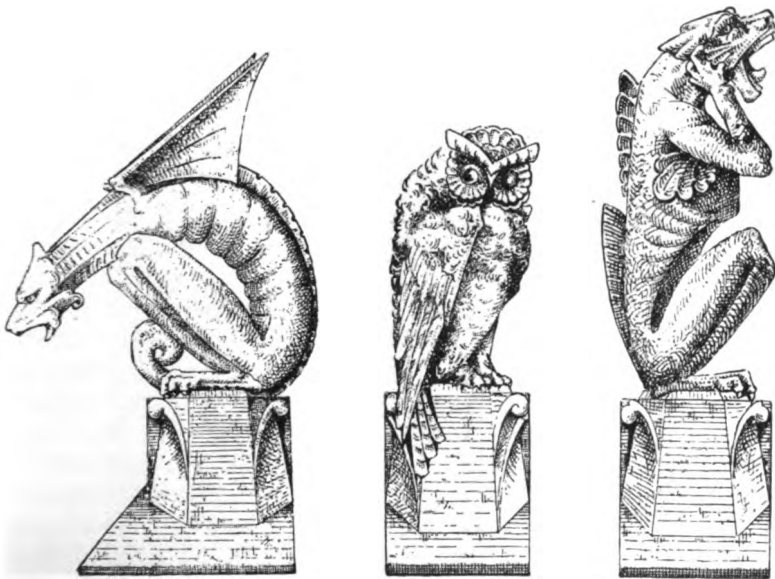


FIG. 48.—FINIALS. Indianapolis Terra Cotta Company.

During the five years of the works' existence it has furnished material for hundreds of important structures in Philadelphia and other cities, of which particular mention may be made of panels and gable work in the library of the University of Pennsylvania, and the Drexel Institute, now being erected in West Philadelphia. A series of animal-head medallions, in high relief, are particularly excellent, and some bas-relief portraits of eminent men, modeled by such sculptors as H. J. Ellicott, John Boyle, and E. N. Conkling, are among their best productions. A medallion of Columbus by Mr. Conkling, and a Cupid and floral panel by Thomas Robertson, are here represented. Admirable work is also being produced by other establishments in Boston, Chicago, and most of our larger cities.



FIG. 49.—MEDALLION OF COLUMBUS.

Recently considerable attention has been given to the construction of brick and tile kilns on scientific principles. Many improved kilns, both on the up-draft and the down-draft systems, have been invented. Art tiles and architectural terra cotta are being burned in up-draft kilns with closed tops, or muffle kilns, in which "saggers," or fire-clay boxes, are used to protect the pieces from direct contact with the flames. Mr. W. A. Euda



FIG. 50.—FLORAL PANEL.

of Cincinnati, has perfected a down-draft kiln which is arranged with compartments in the bottom, which are provided with two separate and distinct sets of flues, one of which carries a portion of the heat into the kiln, and the other conducts a portion from the kiln to stacks or chimneys built in the main wall. The heat is thus divided as it enters the kiln or leaves the furnace, a portion going up through the bags to the ware at the top, while another part surrounds the ware at the bottom of the kiln, securing uniformity of burning and perfect consumption of fuel and

gases. By this method tiles and architectural terra cotta, as well as enamel brick, enameled when green, and thus requiring only one firing, are successfully burned without the use of saggars. Mr. Eudaly also constructs a square down-draft kiln on precisely the same principles, but better adapted to the manufacture of common brick, fire-brick, and sewer-pipe in large quantity, the brick-kilns having a capacity of 80,000 to 300,000, the inside arrangement being such that the heat can be driven to any part of the kiln without altering the fire in the furnace. Thus all the bricks are burned of equal hardness, a vast improvement over the old-fashioned clamp kilns with open tops.

With the failure of natural gas supplies in the West, artificial fuel-gas is destined to become the principal agency in the firing of ceramic products. Its extreme cheapness and perfect adaptability to the needs of the potter will insure its extensive use in the near future. There seems to be no reason to doubt that it will, ere long, supersede wood and coal as a kiln fuel.

At the last convention of the United States Potters' Association, held in Washington in January, 1891, it was decided to open a Pottery School with the co-operation of the Pennsylvania Museum and School of Industrial Art, at Philadelphia, under the efficient management of Prof. L. W. Miller, where designing, modeling, and chemistry shall be taught, and the student fully equipped for usefulness as a practical potter and artist artisan.

American potters have much to learn, but the day is not far distant when, as is the case with other industries, we shall lead the world in this, the oldest and most interesting of the mechanical arts. The Columbian Exposition of 1893 will serve as a powerful impetus toward this end, and the World's Fair Committee appointed by the United States Potters' Association, and composed of such progressive potters as Messrs. J. N. Taylor, Homer Laughlin, J. H. Brewer, James Moses, E. M. Pearson, D. F. Haynes, and C. E. Brockman, will insure a creditable representation of American goods in this branch of the Exhibition.

It is true that American manufacturers have excelled the Eng-

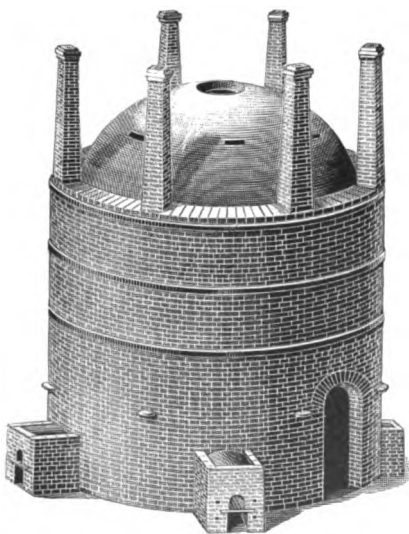


FIG. 51.—THE EUDALY KILN.

lish in branches of the art which they have seriously undertaken. Our copies of certain European wares are fully equal to the originals, and in some directions are superior. It only requires the proper appreciation and encouragement of the public to furnish the incentive to a broader application of the principles which have been mastered by American artists, in order to produce the best that has been attempted by the older French, Italian, and German schools. In our reproductions of the thin Belleek ware of Ireland, the Limoges faience of the Havilands, and specialties of other Continental factories, we not only equal them, but often excel them, in delicacy of form and beauty of glaze and decoration. Our relief tiles surpass in artistic merit anything produced abroad of a similar character, having won the first premium over British wares long before we brought them to their present state of perfection. Our architectural terra cottas have, within the past few years, left England behind, and, could the absurd prejudice against home art and native work be overcome, America would soon lead the world in ceramic fabrics of every nature. Americans are commencing to discriminate between the meritorious and the meretricious, and to decide in favor of American goods. Having the richest mines in the world, from which the best materials are



FIG. 52.—MILITARY PANEL, G. A. R. MEMORIAL HALL, WILKESBARRE, PA.
New York Architectural Terra Cotta Company.

procured, the most talented artists, and the most highly cultured public, there is no reason why we should not compete with the entire globe in the manufacture of artistic pottery and porcelain. It has been repeatedly stated that our artists are imitative, rather than inventive; but while this may, to a certain extent, be true, and some of our potters have been content to creditably reproduce the well-known wares of foreign schools, others have directed their attention to the perfection of distinctively original products, which, for richness of glazing, excellence of body, and beauty of conception, will rank with the best productions of Europe. The inventive genius of American potters has a vast and practically limitless field for experimenting, and the art schools which have sprung up in our principal cities may in time produce a second Robbia, a worthy successor to Palissy, or an emulator of that prince of potters, Josiah Wedgwood.