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XXIV. *Essay upon the Art of the Foundry among the Antients: with some Remarks upon the celebrated Horses of Chio, now brought from Venice to Paris. By M. SEITZ.*

[Concluded from p. 29.]

Multiplied Dangers to which the Horses of Chio were exposed at Constantinople, and their subsequent Removal by the Venetians.

WHEN they arrived at Constantinople, by order of Theodosius the younger, that city contained all the wonders of antient art: there were then to be seen the Olympian Jupiter of Phidias, the Venus of Cnidus and of Praxiteles, the figure in honour of Lysippus, and the Juno of Samos, a colossus of an enormous size. If the greater part of the monuments of Rome perished by the ravages which the Goths committed on that city under their generals Alaric, Genseric, and Totila*; the chefs d'œuvre contained in Constantinople were gradually destroyed by fires;—a scourge to which, by a singular fatality, this city was always exposed.

Under the emperor Zeno, who reigned about the year 470 of the vulgar æra, a fire consumed the library and a great number of other buildings: the fire penetrated to the public square, where it destroyed the Juno of Samos, the Minerva of Lindus, and the celebrated Venus of Cnidus†.

In the fifth year of Justinian's reign, the people, inflamed by the extortions practised by this prince, revolted. The emperor introduced into the city the Hellurians, a barbarous people, in order to quell the insurgents. This was the very worst measure he could take, as the war instantly became general; the Barbarians massacred the people, while those

* Winckelman, in a dissertation upon the ruins of Rome, has maintained that it was not the Barbarians who destroyed the monuments of Rome. According to him, Totila pardoned the inhabitants as soon as he entered the city, and endeavoured to conciliate their good will; but it was not until the flames had ravaged Rome for thirteen days, and three-fourths of the city had been so much destroyed that it could never be restored. It was upon ruins, therefore, that he exercised his benevolence, and with the sole view of recalling those inhabitants who fled in order to escape his fury.

† Zonar. *Annales Constantinop.* lib. xiv. p. 55.

who

who remained shut themselves up in their houses, ascended the roofs, and defended themselves with stones and brick-bats: the Barbarians, enraged, set fire to the houses, which were in a short time almost entirely destroyed. A great number of statues were melted, and 40,000 of the inhabitants perished on this occasion*.

Under the emperor Alexius Comnenus, different quarters of the city were devastated by fire and by earthquakes; the colossal statue of Constantine, which was placed upon the grand column of porphyry 110 feet high, was thrown down by a whirlwind, and killed ten persons in its fall†.

The four horses of Chio had fortunately escaped all these fires; but in the great one of 1203, which was the most dreadful that had ever broke out in that city, they were much exposed, because the flames on that occasion attacked the Hippodrome.

When, in the year 1202, the French, under count Baldwin of Flanders, joined with the Venetians in order to undertake the third crusade, and stop the progress of the sultan Saladin, who threatened to take Jerusalem, the son of the emperor Isaac, whom his brother Alexis had imprisoned on usurping the crown, implored the assistance of the crusaders, in order to save his father from the hands of this usurper, and to re-establish him in his lawful rights. The crusaders warmly espoused his interests, and laid siege to Constantinople. The Venetians had already mounted to the assault on the side towards the sea, and had taken possession of five-and-twenty towers, when Alexis marched out of the city to give battle to the French; but although he had an army infinitely more numerous, a panic seized him, and he fled with the greatest part of his treasures. The inhabitants of Constantinople, astonished at his precipitate flight, proceeded to the prison, where the emperor Isaac was detained, and, clothing him in the imperial robes, made obeisance to him. They then opened the gates of the city, and received their young prince with every demonstration of joy. In order to prevent any quarrels between the Greeks

* Zonar. l. c. p.70.

† Idem, l. c. p: 89,

and the allies, the latter were lodged beyond the gate in a place called Stenon. The French, however, freely frequented the city, and the two nations lived in peace and good understanding. The emperor even invited the allies to prolong their stay at Constantinople, as there was a powerful party among the Greeks against him.

During this period, a quarrel arose between the Greeks and the crusaders. The French had forced and pillaged the mosque of the Saracens ; the Greeks took part with the latter, and assisted them in revenging themselves upon their adversaries, who, being enraged upon finding they were the weakest, set fire to the city. The flames, increased by the wind, gained ground so rapidly that nothing could stop them. The fire lasted eight days, and occupied the space of a league in circumference. A great number of houses, churches, and convents, fell a prey to the devouring element ; among others, the loss of a grand double portico was much deplored, being that of the square of Constantine and the Hippodrome. After this disaster, the good understanding which had subsisted between the Greeks and the French entirely ceased : all foreigners established at Constantinople were obliged to quit the city, to the number of 15,000 ; the young emperor Alexius became cool towards them, and was extremely slow in executing the treaties, so that war soon recommenced with more fury than before. During the war, the young Alexius was imprisoned, and strangled by order of Marzuflus, one of his ministers, and old Isaac died of grief. The crusaders, when informed of this new catastrophe, assembled in council, declared Marzuflus unworthy to reign, and formed the resolution of redoubling their activity to take the city, and proceed to the election of a new emperor. After several attacks, the city was at last taken a second time on an Easter Monday, 1204. Marzuflus withdrew to the palace Bucoleon, and afterwards fled. The city was given up to plunder, while a new fire burst out, which, according to Villehardoin*, destroyed more houses

* *Histoire de la Conquête de Constantinople, par Godefroid de Villehardoin, Marechal de Champagne et de Romanie, p. 132.*

than the largest cities in France at that time contained. The booty, which according to the various conventions was to be divided equally, was so great that it filled three churches; and although a great part was embezzled, it was shared to the value of 400,000 marks silver. After having plundered the living, and profaned the altars, the ashes of the dead were even molested. All the tombs of the emperors were opened, in order to rob them of whatever was precious. At last, when the avarice of the crusaders found no more encouragement, their fury was directed against the statues, which they demolished, either in order to send them to the mint, or to sell them to the founders, who paid the value of the metal only*.

Among these works are enumerated the following:

A colossal Juno, the head of which alone could scarcely be moved by eight oxen.

A Paris presenting the apple to Venus.

A large square monument of bronze, surmounted by a pyramid. In this were represented the labours of the field; lambs frisking to the sound of the shepherd's pipe, the catching of birds, and fishing; Cupids throwing apples, &c.

An equestrian statue in heroic costume, which was in the bullock market: to all appearance it was that of an emperor; but the inscription was lost: some said it was Joshua stretching out his hand to the setting sun, and ordering it to stop: according to others, it was Bellerophon†.

Among the statues which decorated the Hippodrome, they melted down a colossal Hercules in a sitting posture, and full of grief for having killed his children‡: so large was this figure, that its thumb equalled in size the body of a man.

* See NICEŒ CONIATE *Narratio de Statuis Constantinop.* in Fabricius *Biblioth. Græc.* tom. vi. p. 405.—*Note by the Author.*

Part of the above work has been translated by Harris, in his *Philological Enquiries*, vol. ii. p. 301, chap. 5. This work was translated into French by M. Boulard, who was pleased to give it the title of *Histoire littéraire du moyen Age*.—*Note by M. Millin.*

† On the subject of the losses to the arts sustained at Constantinople, we may consult M. Heyne's dissertation *De Interitu Operum cum antiquæ tum recentioris Artis quæ Constantinopoli fuisse memorantur, ejusque Causis ac Temporibus*. *Memoires de Göttingen*, tom. xii, p. 273.—*Note by M. Millin.*

Euripidis Hercules furens.

The ass with his driver, erected by Augustus at Nicopolis*.

The wolf which suckled Romulus and Remus.

A man combating a lion.

A hippopotamus of bronze.

An elephant with a moveable trunk.

Sphinxes, represented in the attitude of birds flapping their wings, as if previous to flying upwards.

A horse, full of ardour, and burning to start into the arena.

A Scylla, or female monster, devouring the companions of Ulysses.

An eagle stretching its wings, in order to carry off a serpent which he held in his claws : upon its wings were seen lines and cyphers, which served for a sun-dial.

A Helen : her tunic, wrought with the utmost beauty, showed the fine shape of her limbs :—a magnificent diadem confined her hair, which fell in ringlets on her shoulders : her languishing eyes, the soft smile of which dwelt upon her lips, half open ; her raised and arched eyelids—every feature, in short, conspired to present a degree of perfection and beauty of which no description can give any idea.

Several charioteers, represented in the different attitudes peculiar to their occupation. They were placed at the eastern goal (*meta*) of the Circus, which was called that of the red faction.

A combat between an ox, a hippopotamus, and a crocodile :—each of the combatants was biting his adversaries ; the victory seemed to lean to no side, and it was evident that the death of all three would finish the combat.

All these and many other chefs d'œuvre were thrown into the flames. This fact alone evinces the barbarism in which the people of the Western Empire were as yet plunged :—the horses of Chio, however, escaped the destruction. History has not preserved to us the name of him who exerted his influence to save them ; but it is very probable, that by order of Dandolo, the doge and general of the Venetians†, they were

* Sueton. in Octavio, cap. 96.

† The Venetians were, for a long period, united with the Greek empire : their merchants had counting-houses at Constantinople, and the doge himself had

were reserved for the republic when the booty was shared, although their removal to Venice did not take place until after the death of this enlightened doge. The first vessels which set out, only carried the precious vases and ornaments of which the church of Saint Sophia had been stripped, with a great quantity of relics, among which there was a flask filled with the blood of Jesus Christ.

After the death of Dandolo, which happened in 1203, Peter Ziani was elected doge of Venice; and the Venetians who were at Constantinople elected as their chief Martin Zeno, by the title of Protesta. He had the charge of the administration of all the provinces, which by the new partition had fallen to the republic, and the diplomatic affairs were expedited in the joint names of the emperor Henry, successor to Baldwin, and Zeno the Protesta. It was the latter who sent the four horses of Chio to Venice, with several precious works in porphyry and marble.

Peter Ziani, the successor to Dandolo in his dignity of doge, adorned the portal of the church of Saint Mark with them, where they remained until 1798, when the emperor Napoleon brought them to Paris as an ornament of his capital, and the trophy of his victories.

Upon the alleged Defects in the Casting which have been discovered in these Horses—Answer to Winckelman—and Conclusion.

The repairs made after the casting, which are to be seen

had a palace there. The inhabitants of Pisa and the Venetians engrossed the commerce of the Levant, which gave them the superiority over all the European nations, as well in riches as in mental acquirements. Henry Dandolo joined to the talents of a good general and a sage politician a most extensive knowledge of the world. When Innocent III. excommunicated the crusaders on account of the taking of Zara, the French leaders, who were all spirited and brave knights, but who could neither read nor write, feared the effects of the anathema, and consented to all the conditions which the bishop of Soissons, as authorised by the pope, prescribed to them before he gave them absolution; while Dandolo, with his Venetians, constantly refused to acknowledge the authority of the pope in temporal affairs, and braved the anathema. Vide Laugier's *Histoire de la République de Venise*, tom. ii.

in the engravings of Zanetti*, are a necessary consequence of the manner in which the antients proceeded to cast their metals. All the bronze statues from Herculaneum exhibit similar repairs. Pliny says†, that the first statues erected to the conquerors in the Olympic games, were modelled upon their own persons, and that these statues were called Iconic, but they were cast solid. Afterwards the art was improved upon, in order to produce the same effect with less metal, and they were cast hollow. Thus, by degrees, succeeded the sure but slow and expensive method at present adopted.

M. Boufférand‡ says, that the antients did not take the trouble of making the first model of plaster, and then cast the mould; but that, after having made their model of the full size with prepared potters' clay, they reduced it piece-meal to a smaller size, and then dipped it into the melted bronze, so that their model thus became a kind of nucleus§.

Hitherto the observations of M. Boufférand have been

* Statue di Venezia, tom. i. pl. 45.

† Lib. xxxiv. cap. 4. sect. 9, *ex membris eorum similitudine expressas*.

A Genius, of Etruscan bronze, to be seen in the Florence cabinet, is wrought so naturally, that sculptors and painters think the mould must have been made upon the body of a young man. Vide GORI, *Mus. Florent.* pl. 45; et *Museum Etruscum*, pl. 87.

‡ Vide Encyc. des Arts et Metiers.

§ According to Philo Byzantius, *De Septem Orbis Miraculis*, cap. v. p. 13, the antients never made any large statue at a single jet, but they melted the parts separately, and joined them afterwards, according to the model they had previously made. *Simulacra artifices primum fingunt, deinde membra divisa conflant, tandem omnia bene composita exigunt*. But this assertion seems to be denied by Pausanias, who, speaking of Rhæcus and Theodorus, says, *αγαλματα δια παντος επιστασαντες εργασασθαι καθυπερ εσθητα εξυφαινοντες*: they knew how to work entire statues like a dress wrought without a seam: a singular expression, but which has been mistaken by translators for statues cast at a single jet. According to the same Philo, the famous Colossus of Rhodes was also cast in parts, but in another way:—they began by casting the legs, then placed them on the ground, melted the thighs above them, and proceeded upwards in such a manner that the hot metal united itself with the cold. This method of proceeding perhaps explains what Pausanias means by *εξυφαινοντες*. The antients were afraid, that by melting large masses at a single cast, the flux might cool in flowing along: Recent experiments have taught us, however, that it will run forty feet before becoming fixed. It is therefore probable, that if we had the same taste for Colossi that the antients had, we should be able to cast them with still more perfection.

just and general; but when he continues to say that they covered the nucleus with wax, and made upon this wax putty moulds, and then finished the work like ourselves, we can state in opposition to this, that wax never has been employed in casting the horses of Venice, nor in any other antique bronzes, where we see pieces hammered into them in order to fill the holes which remained after founding. This defect proceeds from the total absence of wax, which is now made to occupy the space which should be filled by the bronze, and forms the thickness wished to be given to it between the nucleus and the hollow mould, a space which remains void when the wax is melted, and which is filled by the casting, the continuity of which is not interrupted by any obstacle.

If the modern process of founding is more perfect, that of the antients was more expeditious and much less expensive *. After having finished their model, they formed the hollow mould upon it; and in making the mould the different pieces were so joined, that each side of the figure was covered with its proper parts, so as to make two half moulds, adapted throughout their whole length, and the two edges of which joined upon the horses' backs through their whole length, and under the belly in the same manner. At least this observation applies with respect to the horses of Venice, and the moulds of their feet seem to have been made separately. After having finished this part of the process, they diminished the model until they brought it to suit the thickness they wished to give to the metal, and by this operation they formed the nucleus. But this diminution could not be made throughout the whole surface; some plugs must have been left interposed, to hinder the moulds from falling upon the nucleus, and in order to remove them

* All the French founders assembled together, says Winckelman, would not be able in ten years to finish the three hundred and sixty statues made at Athens for Demetrius Phalereus in 300 days. But, according to their manner of operating, the Athenians had no occasion to break the mould in order to draw out the statue, and the same moulds perhaps served several times. How could Lysippus have executed 610 works, according to Pliny, if he did not know how to abridge the labours of the foundry?

to the proper distance wanted for the thickness of the metal. Many of these plugs would be necessary as supports, in order to keep the mould steady, and hinder the nucleus from leaving its place. This being done, they added the moulds of the feet; when the whole was fired, and the founding proceeded in. The founding being finished, these plugs formed so many holes in the metal; but they were made use of in digging out the nucleus or core in pieces, by means of sharp-pointed irons. Every thing being finished, they filled all the holes with plates of copper, hammered and fitted to the openings; and riveted by nails as we see in the horses of Chio, and the bronze statues of Herculaneum.

It would be rash, however, to maintain that this custom was general in all antient works of art; with respect to more recent periods, the observation of M. Bouffernand may apply. The art of founding flourished in the empire of the East. We find in Zonarus that they erected to almost all the emperors of the East bronze statues at Constantinople: and an epigram* of the poet Juvenal, who was contemporary with Theodosius, proves that wax was employed in the statues of that time.

Winckelman† complains much of the manner in which the horses of Venice raise their feet. He says, "Some people assert that horses lift the two feet of one side at one and the same time, and such is the gait of the four horses of Venice." It is evident, however, that Winckelman is mistaken; all the art of Franconi the equestrian would be incapable of making a horse move in this manner.

A horse, when at the gallop, raises his two fore feet at once, and follows by the two hind feet, lifting them one after another, which produces three distinct motions.

A horse, when at a walking pace, moves at four different times, in a diagonal line, or in a cross; that is to say, after having lifted the right fore foot, he lifts the left hind foot, all which is conformable to the laws of mechanism; and this is the gait of the horses of Venice, and of that of Marcus Aurelius in the Capitol.

* Anthol. lib. iv.

† Liv. v. ch. 6, § 16.

A horse,

A horse, when trotting, lifts at the same time the right fore foot and the left hind foot, which makes a double beating.

We see these three kinds of movements upon medals and bas-reliefs; but statues which require a support of three feet are susceptible only of the second.

After the restoration of letters the art of founding re-appeared in Italy in the time of the Medici. The painter André Verrochio was the first who imagined that the antients made a hollow mould upon a statue, or even upon a dead or living subject, in order to form an exact resemblance. This invention naturally inspired him with the idea of using a similar mould for melting a bronze statue: he succeeded, and exercised the art of founding in the manner of the antients, *i. e.* by casting the parts separately and joining them afterwards by soldering. He undertook an equestrian statue of a Venetian general to be executed in this way. But he finished the horse only, having died of a malady contracted from his zeal to execute the work with fidelity. After this, John of Boulogne made use of the same method for casting the equestrian statue of Cosmo de Médicis at Florence.

About the year 1500, Pomponius Gauricus* printed at Naples a treatise upon sculpture, in which he described the ingenious method of proceeding made use of at present for melting equestrian statues at a single cast. He adds in the conclusion, that this science having perished with those who had formerly known and practised it, he thinks he is entitled to assume to himself the merit of the invention†.

Since

* POMPONII GAURICI Neapolitani, *De Sculpturâ Liber ad Herculem Ferrarii Principem*; in *Thesaurò Gronovii*, vol. 9. pag. 731.

† In the time of Gauricus, when few of the Greek authors were as yet printed, it was sufficient to be acquainted with the Greek language in order to qualify a person for being an inventor, and to pass as such in the eyes of the vulgar. They even went so far as to destroy the manuscript, that the plagiarism might never be discovered. A great number of inventions supposed to be modern have been derived from the antients.

In clock-work, nothing is modern except the pendulum; all the wheelwork necessary for putting in motion the indexes of a dial is described in Vitruvius. He also speaks of a kind of sounding machine, which threw a certain number

Since this period we have seen similar monuments erected at Pisa, Placentia, Leghorn, Ferrara, Milan, Venice, and in the Papal states. Several cities of Germany and Holland perpetuated in this manner the memory of their benefactors; and in 1622 the city of Rotterdam erected a bronze statue to the famous Erasmus, the only modern scholar who obtained such an honour.

ber of stones in order to mark the hours. Water-mills, organs with all their keys and interior mechanism, were known in the time of Augustus: it is true that water was employed for keeping up a continual wind; but it would seem this method was soon relinquished, and the same effect produced by means of several pairs of bellows:—an epigram of the emperor Julian upon organs and organists of his time mentions it.

The system of Copernicus is the system of Pythagoras, or rather that of the antient Chaldees, who, without any other assistance than their eyes, had already seen the rotation of the earth around its axis; and all the discoveries to which the telescope and the perfection of mathematical instruments have given rise, are so many proofs of the truth of the antient system. Lastly, the decomposition of light by the prism, upon which the great Newton formed his theory of colours, is to be found in Seneca.—Questions, book i. ch. 7.

If we have gunpowder, the antients had their Greek fire, the effects of which were terrible. in the reign of Louis XV., an inhabitant of Dauphny, of the name of Dupré, who had spent his life in chemical experiments, recovered the secret. This fire was so rapid and so powerful that no art could extinguish it; water only gave it additional activity. Experiments were made with it on the canal at Versailles in presence of the king, in the arsenal at Paris, and at some sea-ports: every where the most intrepid military men trembled at its effects. The king, who wished to avert this new scourge from humanity, forbid the author to communicate his secret to any one, and rewarded him liberally. Dupré is no more, and it is thought his dreadful secret died with him.

Nothing proves the superiority of the antient inventions more powerfully than the five orders of architecture. Modern architects hardly venture to make the least change in the system: it is well known that the finest buildings are those in which these orders reign in their greatest purity. When will a second Callinachus appear to invent a new order? These men of genius, who have really extended the circle of human knowledge, are separated by the interval of ages, and there is nothing more humiliating to the human mind than the slow progress of its attainments. It is true, we speak at present of new inventions as of new fashions: there is not a single mechanic in Paris who does not pretend that he has enriched his trade with some invention: but all these inventors resemble the modern grammarian, who announced discoveries in the Latin language.

It must be confessed, however, that these joint efforts may produce some good effects, and that they are worthy of recompenses and encouragements from government.

The

The first monument of this kind erected in France was the statue of Henry IV. ; the horse was cast at Florence by John of Boulogne: Cosmo II., the grand duke of Tuscany, presented it to Mary of Medeis, queen of France, and at that time regent ; she destined it to consecrate the memory of the king her husband, whose statue was executed by Dupré the sculptor by her orders. It was erected in 1635.

A short time afterwards cardinal Richelieu erected the equestrian statue of Louis XIII. in the Place Royale. The horse was executed in Tuscany by Ricciarelli de Volterre, a pupil of Michael Angelo, and was regarded by some as a superior work, and by others as a middling production. The statue of the king was executed by Biard.

The age of Louis XIV. was so brilliant for the arts, that the splendour of the Augustan age, so much boasted of, is nearly eclipsed by the comparison.

The art of founding declined under Augustus ; and the reports of Pliny and Vitruvius, both upon the taste then reigning in painting, and upon the method of the painters in their days, must give us a very unfavourable idea of their talents, while the names of Girardon, Desjardins, Bouchardon, Lemoine, Paget, Lebrun, Lesueur, Bourdon, Mignard, Juvonet, &c., have been the glory of their age, and the admiration of every country where their works have penetrated.

The statue of Louis XIV. in the Place des Victoires, by Desjardins, and the equestrian statue of the same prince in the Place Vendôme, by Girardon, were unique performances, with respect to beauty of design and the elegance and magnificence of the appendages. The cities of Lyons, Rennes, Dijon, Montpellier, Bourdeaux, and Metz, were necessarily adorned with statues of this prince, and of his successor ; but the revolution of the 18th century was equally fatal to all these works as was the invasion of Attila to the bronzes of Rome, and the fanaticism of the crusaders to those of Constantinople.

France, which produced the talents that decorated the other cities of Europe, is, however, stripped of these chefs-d'œuvre, which formerly formed the ornaments of her public places.

It will not be difficult, however, to replace them. Paris still contains some very distinguished artists in bronze. In the recent exhibitions of the objects of French industry, bronzes have formed an interesting article.

The exploits of our warriors, and of our august chief, have furnished them with subjects worthy of decorating the public places of Paris and the other cities of France, while the immense quantity of cannon taken from the enemy will supply the materials.

XXV. *On the Making of Starch.* By Mr. JAMES GRAHAM,
of Berwick-upon-Tweed*.

STARCH may be made from a variety of articles:—potatoes, in particular, will yield a considerable quantity; but the great labour attending grinding or grating them down has hitherto prevented any great quantity of starch being made from that vegetable. When the potatoes are grated down, they do not require to be laid in steep to ferment after the manner of flour, but must be immediately strained through a sieve; and if the potatoes are of a good quality, the starch will settle to the bottom almost instantly: indeed the operation of straining after the potatoes are grated down cannot be performed too quickly. The produce, however, even from the best, is far less than most people would imagine; the best potatoes I ever used only produced 4 or 4½ stones of starch from 40 stones of potatoes.

Potatoe starch is not saleable in the shops, not having so long and firm a grain as starch from flour; but if properly made is preferable to all others for blue-makers, as it melts or dissolves so easily, and incorporates with the colour with far less trouble than any other substance whatever.

When starch is made from flour, the wheat is not ground so small as when intended for sale, but ground with a broader flag or bran, as the meal and starch are found to separate more readily from the bran. When laid in to steep as much water must be used as to wet completely the whole meal; in three, four, or five days it will ferment, and in

* Communicated by Mr. John Clennell.