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THE

WONDERS

OF

NATURE AND ART.

COMPRISING

UPWARDS OF THREE HUNDRED

OF THE MOST

REMARKABLE CURIOSITIES AND PHENOMENA

IN THE KNOWN WORLD.

WITH

AN APPENDIX

OF INTERESTING EXPERIMENTS, IN DIFFERENT ARTS AND SCIENCES,

FOR THE INSTRUCTION AND ENTERTAINMENT OF YOUNG PEOPLE.

SELECTED FROM THE RESEARCHES OF EMINENT TRAVELLERS, HISTORIANS, AND NATURALISTS.

BY J. TAYLOR.

"There are qualities in the products of Nature yet undiscovered, and combinations in the powers of Art yet untried.—It is the duty of every man to endeavour that something may be added by his industry to the hereditary aggregate of knowledge and happiness."—Dr. Johnson.

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PREFACE.

IN an age when inquiry and research have spread such rich and varied treasures before us,—when the rapid advance of general education has made the thirst for knowledge to become an almost universal passion; the young mind turns with indifference, if not with disgust, from the silly tales and legends which were prepared for the amusement of their grandsires, to "feast on angels' food." The storehouse of NATURE presents an inexhaustible variety of solid information, soul-expanding knowledge, and at the same time rational and cheerful amusement. A skilful hand alone is requisite to seize those beauties she every where presents to our notice; to select those jewels her boundless mine of phenomena contains.

ART also has been, and still is, making rapid strides toward the perfection of her powers. The moist and floating vapour is arrested in its ascent from the boiler, and taught to turn the wheel, to lift the weight, to impel the swift-sailing vessel, and enable it to outstrip the wind; and each day new wonders are achieved by this powerful and useful agent. To collect and arrange these superabundant materials, to cull the beauties glowing in the face of Nature when she smiles, or note her wild sublimities when she bursts upon our astonished senses in

all her grandest operations; to mark the admirable in ART and record her progress in this age of swift advancement in every science, has been the aim of the compiler: how far he has succeeded, must be left with a judicious public to determine.

In preparing this volume for the instruction and amusement of the young of either sex, NATURE and ART have been explored in order that their most admired objects might be selected and blended in one group of dazzling excellence.

The animal and vegetable, the mineral and fossil kingdoms have been searched for rarities; burning mountains have been climbed, the Alps and Andes ascended, caverns explored; while waterfalls, cascades, and the recesses of the deep and boundless ocean have been held in requisition to gratify the thirst of knowledge awakened in the mind of the young and inquiring reader.

The most celebrated public buildings, in all parts of the world, are not only described, but, in many instances, are at once brought before the eye in views engraved from the most elegant designs of modern travellers.

EDITOR.

INTRODUCTION.

THE following work, consisting of upwards of three hundred descriptive curiosities in Nature and Art, and a variety of interesting experiments in natural philosophy, is presented to the public with great deference.

The editor is well aware, that to cull from the rich and inexhaustible storehouse of Nature *only a few* of her wonders, and to describe them with exact precision, is a very arduous undertaking. Dr. Johnson, speaking of this subject, says, "that if a thousand lives should be spent upon it, all its properties would not be found out." This delightful study, has, within the last century, been particularly recommended and practised by many men of science and deep learning, who, to encourage a love of the same in the minds of the rising generation, have risked their lives and fortunes to obtain specimens deserving of public notice.

To abridge from some of these learned, able, and indefatigable collectors subjects of instruction and amusement, without tiring the mind with prolixity, has been the grand object of the compiler of this volume. Rational pleasure is the theme recommended by most moralists. "To omit," says a modern essayist, "a single social duty for the cultivation of a polyanthus were ridiculous as well as criminal; but to pass by the beauties lavished before us without observing them is no less ingratitude than stupidity." Mr. Ray also remarks, "that no knowledge can be more pleasant to the soul than this; none so gratifying, or that doth so feed the mind." The language of Nature is that of delight. There is no region in which the volume of instruction is not unfolded. In every climate is found proper food for the support of the inhabitants, and proper medicines for the removal of their diseases: and even should every age change its food and its diseases, there would still be found in the world supplies sufficient for the inhabitants,—so bountiful and provident is Nature.

"The distribution of oceans, seas, and rivers, the variety of

fields, meadows, and groves; the luxuriance of fruits, herbs, and flowers; the return of spring, summer, autumn, and winter, not only regular in their approaches, but bringing with them presents to make their return desirable; the pleasing vicissitudes of day and night; all have a voice, which, by telling man he is constantly receiving favours, reminds him that he should always be ready to bestow them.'

The subjects collected for the volume are of a very general nature, carefully taken from authors of the highest respectability, but celebrated for their zeal in developing the wonders of nature and art. Various remarkable curiosities are explained. The mineral, fossil, and vegetable kingdoms have been searched for varieties. Burning mountains and caverns have been explored. Waterfalls, cascades, and the wonders of the deep, are particularly noticed; and the most celebrated public buildings in all parts of the world, are not only described, but are frequently illustrated by views from the elegant designs of modern travellers.

A copious Appendix is added for the particular amusement of young people, of mathematical, mechanical, chemical, and philosophical experiments; with explanatory Plates, which will render the amusement more practicable to the young philosopher.

The whole is interspersed with poetical selections; and a series of Wood-cuts, elegantly engraved by artists of the first-rate ability. In short, no labour or expense has been spared to render the work *unique* in itself, and equal, if not superior to any treatise of the kind hitherto published.

J. T.

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THE

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NATURE AND ART

MAN.

MAN IS A MOVING MIRACLE!

MAN, the image of the Great Supreme, the last and noblest of all His works, is distinguished from other animals, no less by his external form, than by his internal powers. His figure indicates him to be the lord of the creation: his body is upright, and touches the earth only with its extremities: his countenance is stamped with the characters of dignity and command. He is a thinking and a rational being. His body is divisible, extended, and penetrable, subject to disease, decay, and death; his soul is indivisible, unextended, and immaterial. With what wonderful sublimity has our inimitable poet expressed himself on this occasion: "What a piece of work is man! How noble in reason! How infinite in faculties! In form and moving, how express and admirable! In action, how like an angel! In apprehension, how like a God The beauty of the world, the paragon of animals!"

The number of separate bones in the human frame is about 248. Eight separate bones in the skull, form a vault, or cell, in which the brain is enclosed.—HARTLEY'S *Principles of the Sciences.*

"I challenge any man (says Dr. Paley) to produce, in the joints and pivots of the most complicated or the most flexible machine that was ever contrived, a construction more artificial, or more evidently artificial than that which

is seen in the vertebra of the *human neck*. Two things were to be done: the head was to have the power of bending forward and backward, as in the act of nodding, stooping, looking upward or downward, and, at the same time, of turning itself round upon the body to a certain extent, the quadrant we will say, or rather, perhaps, a hundred and twenty degrees of a circle. For these two purposes two distinct contrivances are employed: first, the head rests immediately upon the uppermost of the vertebræ, and is united to it by a *hinge*-joint; upon which joint the head plays freely forward and backward, as far either way as is necessary, or as the ligaments allow, which was the first thing required: secondly, to make the head capable of this, a further mechanism is introduced; not between the head and the uppermost bone of the neck, where the hinge is, but between that bone and the bone next underneath it. It is a mechanism resembling a *tenon and mortise*. This second, or uppermost bone but one, has what anatomists call a process, viz., a projection, somewhat similar, in size and shape, to a tooth; which tooth entering a corresponding hole or socket in the bone above it, forms a pivot or axle, upon which that upper bone, together with the head which it supports, turns freely in a circle; and as far in the circle as the attached muscles permit the head to turn. Thus are both motions perfect, without interfering with each other. When we nod the head, we use the hinge-joint, which lies between the head and the first bone of the neck. When we turn the head round, we use the tenon and mortise, which runs between the first bone of the neck and the second. We see the same contrivance and the same principle employed in the frame or mounting of a telescope. It is occasionally requisite that the object end of the instrument be moved up and down, as well as horizontally or equatorially. For the vertical motion, there is a hinge, upon which the telescope plays; for the horizontal or equatorial motion, an axis upon which the telescope and the hinge turn round together. And this is exactly the mechanism which is applied to the motion of the head."

The circulation of the blood from the head into the arteries is thus described by the same elegant writer:

"The next thing to be considered is the engine which

works this machinery, viz., the *heart*. For our purpose it is unnecessary to ascertain the principle upon which the heart acts. Whether it be irritation excited by the contact of the blood, by the influx of the nervous fluid, or whatever else be the cause of its motion, it is something which is capable of producing, in a living muscular fibre, reciprocal contraction and relaxation. This is the power we have to work with; and the inquiry is, how this power is applied in the instance before us. There is provided, in the central part of the body, a hollow muscle, invested with spiral fibres, running in both directions, the layers intersecting one another; in some animals, however, appearing to be semicircular rather than spiral. By the contraction of these fibres, the sides of the muscular cavities are necessarily squeezed together, so as to force out from them any fluid which they may at that time contain; by the relaxation of the same fibres, the cavities are in their turn dilated, and, of course, prepared to admit every fluid which may be poured into them. Into these cavities are inserted the great trunks, both of the arteries which carry out the blood, and of the veins which bring it back. This is a general account of the apparatus; and the simplest idea of its action is, that, by each contraction, a portion of the blood is forced by a syringe into the arteries; and, at each dilation, an equal portion is received from the veins. This produces, at each pulse, a motion and change in the mass of blood, to the amount of what the cavity contains, which in a full-grown human heart is about an ounce, or two table spoons full. How quickly these changes succeed one another, and by this succession how sufficient they are to support a stream or circulation throughout the system, may be understood from the following computation.—Each ventricle will, at least, contain one ounce of blood. The heart contracts four thousand times in one hour; from which it follows, that there pass through the heart, every hour, four thousand ounces, or three hundred and fifty pounds of blood. Now the whole mass of blood is said to be about twenty-five pounds; so that a quantity of blood, equal to the whole mass of blood, passes through the heart fourteen times in one hour, which is about once every four minutes. Consider what an affair this is, when we come to very large animals. The aörta

of a whale is larger in the bore than the main pipe of the water-works at London Bridge; and the water roaring in its passage through that pipe is inferior in impetus and velocity, to the blood gushing from the whale's heart. Hear Dr. Hunter's account of the dissection of a whale: "The aörta measured a foot diameter; ten or fifteen gallons of blood are thrown out of the heart at a stroke, with an immense velocity, through a tube of a foot diameter.' The whole idea fills the mind with wonder."—PALEY'S *Theology*.

MEN REMARKABLE FOR CAPACIOUSNESS OF MEMORY, GREAT AGE, BODILY STRENGTH, *&c.*

MAGLIABECHI.

ANTONIO MAGLIABECHI was born at Florence, October 29th, 1633. Such was the poverty of his parents, that they thought themselves happy in getting him into the service of a man who sold herbs and fruit. There he took every opportunity, though he could not tell one letter from another, to pore on the leaves of some old books that served for waste paper, declaring that he loved it of all things. A neighbouring bookseller, who observed this, took him into his service. Young Magliabechi soon learned to read; and his inclination for reading became his ruling passion, and a prodigious memory his distinguished talent. He read every book that came into his hands, and retained not only the sense of what he read, but often all the words, and the very manner of spelling, if singular. To make trial of the force of his memory, a gentleman lent him a manuscript he was going to print. Some time after it was returned, the gentleman came to him, with a melancholy face, and pretended it was lost. Magliabechi being requested to recollect what he remembered of it, *wrote the whole without missing a word, or varying the spelling*. He was consulted by all the learned who proposed to write on any subject. If a priest, for instance, was going to compose a panegyric on a saint,

Magliabechi would tell him every author, to the number of an hundred sometimes, who had said any thing of that saint, naming the book and the page, and the very words. He did this so often, and so readily, that he came at last to be looked upon as an oracle; and Cosmo III., Grand Duke of Florence, made him his librarian, the most suitable office to Magliabechi's genius. In the latter part of his life, when a book came into his hands, he would read the title page all over, dip here and there in the preface, dedication, and prefatory advertisements, if there were any; and then cast his eyes on each of the divisions, sections, or chapters. After this he could tell at any time what the book contained.

Though Magliabechi must have lived a very sedentary life, yet he attained to the age of eighty-one. He died July 14th, 1714, in the midst of public applause, after enjoying, during all the latter part of his life, such an affluence as very few persons have ever produced by their knowledge and learning. By his will he left a very fine library collected by himself for the use of the public, with a fund to maintain it, and the overplus of the fund to the poor. It had been usual for every author and printer to make him a present of a copy of every thing they published.—*New Art of Memory.*

JEDEDIAH BUXTON.

Jedediah Buxton, a poor illiterate English peasant, who could neither read nor write, and who died some years ago, was remarkable for his knowledge of the relative proportions of numbers, their powers, and progressive denominations. To these objects he applied the whole force of his mind, and upon these his attention was so constantly rivetted, that he frequently took no notice of external objects, and when he did it was only with respect to their numbers. If any space of time was mentioned before him, he would soon after say, that it contained so many minutes; and if at any distance, he would assign the number of hair breadths in it, even when no question was asked him by the company.

Being required to muitiply 456 by 378, he gave the pro-

duct by mental arithmetic, as soon as a person in company had completed it in the common way. Being requested to work it audibly, that his method might be known, he multiplied 456 first by 5, which produced 2,280; this he again multiplied by 20, and found the product 45,600, which was the multiplicand multiplied by 100; this product he again multiplied by 3, which produced 136,800, the product of the multiplicand by 300. It remained therefore to multiply this by 78, which he effected by multiplying 2,280, or the product of the multiplicand multiplied by 5, by 15, as 5 times 15 is 75. This product being 34,200, he added to 136,800, which was the multiplicand multiplied by 300, and this produced 71,000, which was 375 times 456. To complete his operation, therefore, he multiplied 456 by 3, which produced 1,368; and having added this number to 171,000, he found the product of 456 multiplied by 378, to be 172,368.

By this it appears, that Jedediah's method of arithmetic was entirely his own, and that he was so little acquainted with the common rules as to multiply 456 first by 5, and the product by 20, to find what sum it would produce, multiplied by 100; whereas, had he added two ciphers to the figures, he would have obtained the product all at once.

A person who had heard of his astonishing performances, meeting with him once accidentally, in order to try his calculating powers, he proposed to him the question: Admit a field to be 423 yards long, and 383 yards broad, what is the area? After the figures were read to him distinctly, he gave the true product, 162,009 yards, in the space of two minutes; for the proposer observed by his watch how long each operation took him. The same person asked him how many acres the said field measured? and in eleven minutes he replied, 33 acres, 1 rood, 35 perches, 20 yards, and a quarter. He was then asked how many barley-corns would reach eight miles? in a minute and a half he answered, 1,520,640 barley-corns. He was likewise asked, supposing the distance between York and London to be 204 miles, how many times will a coach-wheel turn round in that space, allowing the circumference of the wheel to be six yards? in thirteen minute he answered 59,840 times

Though these instances, which are well authenticated, are sufficient proofs of Jedediah's astonishing strength of mind, for the farther satisfaction of the curious, we shall subjoin the following: Being asked how long, after the firing of one of the cannons at Retford, the report might be heard at Haughton park, the distance being five miles, and supposing the sound to move at the rate of 1,142 feet in one second of time? he replied, after about a quarter of an hour, in 23 seconds, 7 thirds, and that 46 remained. He was then asked, admit that 3,584 broccoli plants are set in rows, four feet asunder, and the plants seven feet apart in a rectangular plot of ground, how much land will those plants occupy? In nearly half an hour he said, two acres, one rood, eight perches and a half.

This extraordinary man would stride over a piece of land, or field, and tell the contents of it with as much exactness as if he had measured it by the chain. In this manner he measured the whole lordship of Elmeton*, of some thousands of acres, belonging to Sir John Rhodes, and brought him the contents, not only in acres, roods, and perches, but even in square inches; after this he reduced them, for his own amusement, into square hair breadths, computing about 48 to each side of an inch, which produced such an incomprehensible number, as appeared altogether astonishing

The only objects of Jedediah's curiosity, next to figures, was the king and royal family, and his desire to see them was so strong, that, in the beginning of the spring 1754, he walked up to London for that purpose, but was obliged to return disappointed, as his majesty had removed to Kensington, just as he arrived in town. He was, however, introduced to the Royal Society, whom he called the *Volk of the Siety Court.* The gentlemen who were there present asked him several questions in arithmetic, to prove his abilities, and dismissed him with a handsome gratuity.

During his residence in London, he was carried to see the tragedy of King Richard III. performed, at Drury-lane play-house, and it was expected that the novelty of every thing in this place, together with the splendour of the sur-

* Elmeton, a small village near Chesterfield, was the place o his nativity.

rounding objects, would have fixed him with astonishment, or that his passions would, in some degree, have been roused by the action of the performers, even if he did not fully comprehend the dialogue. But his thoughts were otherwise employed; during the dances, his attention was engaged in reckoning the number of steps. After a fine piece of music, he declared that the innumerable sounds produced by the instruments, perplexed him beyond measure; but he counted the words uttered by Mr. Garrick in the whole course of the entertainment, and affirmed, that in this he had perfectly succeeded.

Born to no fortune, and brought up to no particular profession, Jedediah supported himself by the labour of his hands; and though his talents, had they been properly cultivated, might have qualified him for acting a distinguished part on the theatre of life, he pursued "the noiseless tenor of his way," sufficiently contented if he could gratify the wants of nature, and procure a daily sustenance for himself and family.

If his enjoyments were few, they seem to have been fully equivalent to his wishes. Though favoured by nature in a very singular manner, and though the powers of his mind raised him far above his humble companions, who earned their bread in the like manner, by the sweat of their brow, ambitious thoughts never interrupted his repose, nor did he on his return from London regret the loss of any of those delicacies which he had left behind him. It is to such characters as Buxton, that the poet Gray alludes, in his Elegy in a Country Church-yard, where he says:

> Full many a gem of purest ray serene,
> The dark unfathom'd caves of ocean bear:
> Full many a flower is born to blush unseen.
> And waste its sweetness in the desert air.

Jedediah was a married man, and had several children. He died in 1778, being about seventy years of age.

When any person asked him to calculate a question, he would sit down, take off his old brown hat, and resting upon his stick, which was generally a very crooked one, he would set to work. He mostly wore on his head either a linen or woollen cap, with a handkerchief thrown carelessly round his neck.—ADAM'S *Anecdotes.*

DE COURCY, EARL OF ULSTER,

Lived in the reign of King John, and was remarkable for an extraordinary degree of strength, which was the cause of the family privilege of being covered before the king. This privilege appears to have been granted by that monarch in 1203, when John de Courcy, Earl of Ulster, was supplanted, and lost the king's favour. Hugh de Lacy, the younger, Earl of Meath, who was formerly joined with him in the government of Ireland, alleging he had spoken several disrespectful words, highly reflecting on the king about the murder of his nephew Arthur, Duke of Britany, in France, (whose right to the crown was before that of King John); upon which the king, being sorely displeased, ordered the said Lacy, who was then governor of Ireland, to seize the Earl of Ulster, and send him prisoner to England. Lacy, who was the earl's grand enemy, gladly obeyed the command, and several times attempted to take him by force; but, finding that would not do, he at last hired some of the earl's own servants to betray their master into his hands, which took effect on Good Friday, 1203; for on that day the earl (according to the devotion of the times) was walking unarmed and barefoot, round the church-yard of Downpatrick, for penance. Lacy and his party came upon him unawares, and he, having nothing to defend himself but the pole of a wooden cross which stood in the church-yard, was overpowered, and forced to yield, after he had killed thirteen of Lacy's men. This great earl, after being thus betrayed, was sent prisoner to London; and, after he had been confined some time in the Tower, a dispute arose between King John, of England, and Philip Augustus, King of France, about the title to the duchy of Normandy, which, to hinder the great effusion of human blood, was referred to two champions to decide; the French champion was ready, but none of King John's subjects would answer the challenge: upon which the king was informed, that John de Courcy, late Earl of Ulster who was then a prisoner in the Tower of London, was the only man in his dominions who could do it, if he would undertake it. The king being thus informed, sent twice to the earl for that purpose; but he refused it each time, saying, "Not for him; for I esteem him unworthy the

adventure of my blood, by reason of the ungrateful returns he made for my services and loyalty to the crown, in imprisoning me unheard, at the suit of my rival and enemy, Hugh de Lacy." But the king sending the third time, to know if he would fight for the honour of his country, he made this answer: "That for the crown and dignity of the realm, in which many an honest man lived against his will, (meaning the king,) I shall be contented to hazard my life." The day of combat being appointed, (in Normandy,) the earl's own sword was sent for out of Ireland; but when the day came, and every thing was ready for the fight, and the champions were entered the lists, in the presence of the Kings of England, France, and Scotland, the French champion, not liking the strong proportion of the earl's body, nor the terrible weapon he bore in his hand, when the trumpet sounded the last charge, set spurs to his horse, broke through the lists, and fled into Spain, from whence he never returned. The French champion thus taking his flight, the victory was adjudged to the Earl of Ulster; but the kings hearing of his great strength, and being willing to see some trial of it, ordered a helmet of excellent proof, full faced with mail, to be laid upon a block of wood, which the earl with one blow cut asunder, and struck his sword so deep into the wood, that none there present but himself could draw it out again; which sword, together with his armour, are to this day preserved in the Tower of London. After this noble performance, the king restored him to his former titles and estate, which was valued at 25,000 marks sterling per annum, a vast income in those days; and likewise bade him ask for any thing else in his gift he had a mind to, and it should be granted; upon which the earl replied, he had titles and estate enough, but desired that he and his successors, the heirs male of his family (after him) might have the privilege, after their first obeisance, to be covered in the royal presence of him and his successors, kings of England, which the king granted; and the said privilege is preserved in the family to this day. The earl afterwards arriving in England, attempted fifteen several times to cross the seas from thence to Ireland, but was every time put back by contrary winds; whereupon he altered his course, and went into France, where he died

in the year 1210, leaving issue by Africa, his widow, daughter to Godfrey, King of the Isle of Man, and of the Western Isles of Scotland, Myles, his heir and successor.—KIRBY'S *Wonderful Museum.*

THOMAS CARN.

The most remarkable instance of longevity which we meet with in British history is that of Thomas Carn, who, according to the parish register of St. Leonard, Shoreditch, died the 28th of January, 1588, at the astonishing age of two hundred and seven years. He was born in the reign of Richard II. anno 1381, and lived in the reigns of twelve kings and queens, namely, Richard II.—Henry IV., V., and VI.—Edward IV. and V.—Richard III.—Henry VII. and VIII.—Edward VI.—Mary, and Elizabeth. The veracity of the above may be readily observed by any person who chooses to consult the above register.—TAYLOR'S *Annals of Health and Long Life.*

PETER CZARTAN.

Peter Czartan, by religion a Greek, was born in the year 1539, and died on the 5th of January, 1724, at Rofrosh, a village four miles from Temeswaer, on the road to Karansebes: he had lived, therefore, one hundred and eighty-four years. When the Turks took Temeswaer from the Christians, he was employed in keeping his father s cattle. A few days before his death, he had walked, supported by a stick, to the post-house at Rofrosh, to ask alms from the passengers. His eyes were exceedingly red, but he still enjoyed a little sight; the hair of his head and beard were greenish white, like mouldy bread; and some of his teeth were still remaining. His son, who was ninety-seven, declared that his father had formerly been a head taller; that he married at a great age for the third time, and that himself was born in this marriage. He was accustomed, according to the principles of his religion, to observe the fast-days with great strictness, to use no other food than milk, a kind of cakes called by the Hungarians *kollaschen*, and to drink of the brandy made in the country.

He had children, descendants in the fifth generation, with whom he sometimes sported, carrying them in his arms. His son, though ninety-seven, was still hale and lively. Field Marshal Count Von Wallis, Governor of Temeswaer, hearing that this old man was sick, caused a likeness of him to be taken, which was scarcely finished when he died. The above account is extracted from a letter written to the States General of the United Netherlands, by their envoy Hamelbraning, at Vienna, and dated January 29th, 1724.—*Annals of Health*, &c

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THOMAS PARR.

Thomas Parr, son of John Parr, was born at Alderbury, in the parish of Winnington, in Shropshire, in the reign of king Edward IV. anno 1488. When 80 years old he married his first wife, Jane, and in the space of 32 years had but two children by her, both of them short-lived; the one lived but a month, the other only a few years. Being aged 120, he became enamoured of Katherine Milton, whom he married, and had children by her. Two months before his death, he was brought by Thomas Earl of Arundel, to Westminster, where he slept away most of his time, and is thus characterized by an eye-witness:

> From head to heel, his body had all over,
> A quick-set, thick-set, nat'ral hairy cover.

Change of air and diet, better in itself, but worse for him, with the trouble of many visitants, or spectators, are rather conceived to have accelerated his death, which happened at Westminster, November 15th, 1632, aged 152 years.

This aged man lived in ten reigns, viz., Edward IV., Edward V., Richard III., Henry VII., Henry VIII., Edward VI., Queen Mary, Queen Elizabeth, King James, and Charles I.

ROBERT PARR.

Robert Parr died at Kinon, a small village near Bridgenorth, Shropshire, in August, 1757, aged 124 years.

HENRY JENKINS.

He was great grand-son of old Thomas Parr, who lies buried in Westminster Abbey, and died in the reign of King Charles I. What is remarkable, the father of Robert was above 109; the grand-father 113; and the great grandfather, the said Thomas, aforesaid, is well known to have died at the amazing age of 152.

HENRY JENKINS.

Henry Jenkins, of the parish of Bolton, in Yorkshire, being produced as a witness, at the assizes there, to prove a right of way over a man's ground, he there swore to near 150 years' memory; for at that time, he said, he well remembered a way over that ground. And being cautioned by the judge to beware what he swore, because there were two men in court of above 80 years of age each, who had sworn they remembered no such way, he replied, "That those men were boys to him." Upon which the judge asked those men how old they took Jenkins to be? who answered, they knew him very well, but not his age, but that he was a very old man when they were boys. Dr. Tancred Robinson, fellow of the College of Physicians, adds farther, concerning this Henry Jenkins, that upon his coming into his sister's kitchen to beg an alms, he asked him how old he was? who after a little pausing, said, he was about an hundred and sixty-two or three. The doctor asked him what kings he remembered; he said, Henry VIII. What public thing he could longest remember? He said, the fight at Flodden-field. Whether the king was there? He said, no, he was in France, and the Earl of Surry was general. How old he was then? He said, about 12 years old. The doctor looked into an old chronicle that was in the house, and found that the battle of Flodden-field was 152 years before; that the earl he named was general, and that Henry VIII. was then at Tournay. Jenkins was a poor man, and could neither read nor write. There were also four or five in the same parish, reputed to be 100 years old, or near it, who all said he was an elderly man ever since they knew him. This remarkable man died on the 8th of December, 1670, at Ellerton-upon-Swale, at the amazing age of 169 years.

What a multitude of events, says an ingenious author, have crowded into the period of this man's life! He was born when the Roman Catholic religion was established by law; he saw the supremacy of the Pope overturned; the dissolution of monasteries; popery established again; and, at last, the Protestant religion securely fixed on a rock of adamant. In his time the *Invincible Armada* was destroyed; the Republic of Holland formed; three queens beheaded, Anne Boleyn, Catherine Howard, and Mary Queen of Scots. A king of Spain seated upon the throne of England; a king of Scotland crowned king of England at Westminster, and his son beheaded before his own palace, his family being proscribed as traitors; and, last of all, the great fire in London, which happened in 1666, toward the close of his wonderful life.

He was buried in Bolton church-yard, near Catterick and Richmond, in Yorkshire, where a small pillar was erected to his memory, on which is the following epitaph, composed by Dr. Thomas Chapman, Master of Magdalen College, Cambridge, from 1746 to 1760:

Blush not, marble,
To rescue from oblivion
the memory of HENRY JENKINS:
a person obscure in birth,
but of a life truly memorable:
for
he was enriched with the goods of Nature,
if not of Fortune;
and happy in the duration,
if not the variety of his enjoyments:
and though the partial world despised and
disregarded his low and humble state,
the equal eye of Providence beheld
and blessed it
with a Patriarch's health
and length of days;—
to teach mistaken man
those blessings are entailed on
temperance,
a life of labour, and a mind at ease.
He lived to the amazing age of 169.

Annals of Health.

MANNERS AND CUSTOMS.

TATTOOING.

Among all the known nations of the earth, none have carried the art of tattooing to so high a degree of perfection as the inhabitants of the Washington Islands. The regular designs with which the bodies of the men of *Nukahiwa* are punctured from head to foot, supplies, in some sort, the absence of clothing; for, under so warm a climate, clothing would be insupportable to them. Many people here seek as much to obtain distinction by the symmetry and regularity with which they are tattooed, as among us by the elegant manner in which they are dressed; and although no real elevation of rank is designated by the greater superiority of these decorations, yet as only persons of rank can afford to be at the expense attendant upon any refinement in the ornaments, it does become, in fact, a badge of distinction.

The operation of tattooing is performed by certain persons, who gain their livelihood by it entirely, and those who perform it with the greatest dexterity, and evince the greatest degree of taste in the disposition of the ornaments, are as much sought after as among us a particularly good tailor. Thus much, however, must be said, that the choice made is not a matter of equal indifference with them as with us; for if the punctured garment be spoiled in the making, the mischief is irreparable, it must be worn, with all its faults, the whole life through.

For performing the operation, the artist uses the wing bone of a tropic bird, *phaëton æthereus*, which is jagged and pointed at the end after the manner of a comb, sometimes in the form of a crescent, sometimes in a strait line, and larger or smaller, according to the figures which the artist intends to make. This instrument is fixed into a bamboo handle about as thick as the finger, with which the puncturer, by means of another cane, strikes sogently and so dexterously, that it scarcely pierces through the skin. The principal strokes of the figures to be tattooed are first sketched upon the body with the same dye that is

afterwards rubbed into the punctures, to serve as guides in the use of the instrument. The punctures being made so that the blood and lymph ooze through the orifice, a thick dye, composed of ashes from the kernel of the burning nut, *aleurites triloba*, mixed with water, is rubbed in. This occasions at first a slight degree of smarting and inflammation; it then heals, and when the crust comes off, after some days the bluish or blackish-blue figure appears.

As soon as an inhabitant of *Nukahiwa* approaches towards the age of manhood, the operation of tattooing is begun, and this is one of the most important epochs of his life, the artist is sent for, and the agreement made with him that he is to receive so many hogs as his pay; the number is commonly regulated according to the wealth of the person to be tattooed, and the quantity of decoration bestowed is regulated by the pay. While we were at the island, a son of the chief Katanuah was to be tattooed. For this purpose, as belonging to the principal person in the island, he was put into a separate house for several weeks, which was *tabooed;* that is to say, it was forbidden to every body, except those who were exempted from the *taboo* by his father, to approach the house; here he was to remain during the whole time that the operation continued. All women, even the mother, are prohibited from seeing the youth while the *taboo* remains in force. Both the *operator* and the *operatee* are fed with the very best food during the continuance of the operation: to the former, these are days of great festivity. In the first year only the ground-work of the principal figures upon the breast, arms, back, and thighs, is laid; and in doing this, the first punctures must be entirely healed, and the crust must have come off before new ones are made. Every single mark takes three or four days to heal; and the first sitting, as it may be called, commonly lasts three or four weeks.

While the patient is going through the operation, he must drink very little, for fear of creating too much inflammation; and he is not allowed to eat early in the morning, only at noon and in the evening. When once the decorations are begun, some addition is constantly made to them at intervals of from three to six months, and this is not unfrequently continued for thirty or forty years before the whole tattooing is completed. We saw some old men

of the higher ranks, who were punctured over and over to such a degree, that the outlines of each separate figure were scarcely to be distinguished, and the body had an almost negro-like appearance. This is, according to the general idea, the height of perfection in ornament, probably because the cost of it has been very great; and it, therefore, shews a person of superlative wealth. It is singular that the men of distinction should place their gratification in acquiring this dark hue, while the women place theirs in preserving their original fair complexion uninjured.

The tattooing of persons in a middling station is performed in houses erected for the purpose by the tattooers, and *tabooed* by authority. A tattooer, who visited us several times on board the ship, had three of these houses, which could each receive eight or ten persons at a time: they paid for their decorations according to the greater or less quantity of them, and to the trouble the figures required. The poorer islanders, who have not a superabundance of hogs to dispose of in luxuries, but live chiefly upon bread-fruit, are operated upon by novices in the art, who take them, at a very low price, as subjects for practice; but their works are easily distinguishable, even by a stranger, from those of an experienced artist. The lowest class of all, the fishermen principally, (but few of whom we saw,) are often not able to afford even the pay required by a novice, and are, therefore, not tattooed at all.

The women of *Nukahiwa* are very little tattooed, differing in this respect from the females of the other South Sea islands. The hands are punctured from the ends of the fingers to the wrist, which gives them the appearance of wearing gloves, and our glovers might very well borrow from their patterns, and introduce a new fashion, among the ladies, of gloves worked *à la Washington*. The feet, which among many are tattooed, are like highly-ornamented half-boots; long stripes are, besides, sometimes to be seen down the arms of the women, and circles round them, which have much the same effect as the bracelets worn by European ladies: some have, also, their ears and lips tattooed. The women are not, like the men, shut up in a tabooed house, while they are going through this operation; it is performed, without any ceremony, in their own

houses, or in those of their relations,—in short, wherever they please.

Sometimes a rich islander will, either from generosity, ostentation, or love to his wife, make a feast in honour of her, when she has a bracelet tattooed round her arm, or perhaps her ear ornamented. A hog is then killed, and the friends of both sexes are invited to partake of it, the occasion of the feast being made known to them. It is expected that the same courtesy should be returned, in case of the wife of any of the guests being punctured. This is one of the few occasions when women are allowed to eat hogs' flesh. If, in a very dry year, bread-fruit, hogs, roots, and other provisions, become scarce, any one who has still a good stock of them, which commonly happens to the chief, in order to distribute his stores, keeps open table for a certain time, to an appointed number of poor artists, who are bound to give in return some strokes of the tattoo to all who choose to come for it. By virtue of a *taboo*, all these brethren are engaged to support each other, if in future some happen to be in need, while the others are in affluence.

The figures with which the body is tattooed are chosen with great care, and appropriate ornaments are selected for the different parts. They consist partly of animals, partly of other objects which have some reference to the manners and customs of the islands; and every figure has here, as in the Friendly Islands, its particular name. Upon an accurate examination, curved lines, diamonds, and other designs, are often distinguishable between rows of punctures, which resemble very much the ornaments called *à la Grecque*. The most perfect symmetry is observed over the body. The head of a man is tattooed in every part: the breast is commonly ornamented with a figure resembling a shield; on the arms and thighs are stripes, sometimes broader, sometimes narrower, in such directions that these people might very well be presumed to have studied anatomy, and to be acquainted with the course and dimensions of the muscles. Upon the back is a large cross, which begins at the neck, and ends with the last vertebræ. In the front of the thigh are often figures, which seem intended to represent the human face. On each side of the calf of the leg is an oval figure, which

produces a very good effect. The whole, in short, displays much taste and discrimination. Some of the tenderest parts of the body, the eye-lids for example, are the only parts not tattooed.—*See the plate, copied from Langsdorff's Voyage round the World.*

CHINESE FEAST OF LANTERNS.

On the Feast of Lanterns, every part of the empire is so completely illuminated, that if a person could take a view of it at once, all the country would seem in a blaze; for every person, both in city and country, on the coast and on the rivers, light up painted lanterns of various forms and sizes. Persons of ordinary rank will expend ten or fifteen pounds English on this occasion; and the emperor and his chief mandarins will spend two or three hundred. Even the most indigent families exert themselves on this festival, and, according to the best of their abilities, contribute to the general illumination.

The lanterns used on this occasion are generally large, of various shapes, and covered with transparent silk, on which are painted flowers, animals and human figures; they are lighted by lamps or wax candles, and to the corners of each are fixed elegant streamers of silk or satin. Some of the largest lanterns exhibit moving figures, like the Chinese shades that may be seen in London. Persons, who lie concealed, put these figures in motion, by means of imperceptible threads; and the spectators are highly amused with horses galloping, ships sailing, armies in full march, &c. Some accompany these moving figures with humorous expressions, that seem to procced from the shades on the lantern; while others carry about serpents of an enormous length, illuminated within from the head to the tail, and so contrived that they wreathe about in different forms as if they were alive.

To augment the splendour of this festival, the Chinese exhibit a variety of those capital fire-works for which they are universally celebrated. Magailens informs us, that he was greatly surprised at one of these exhibitions, where an arbour of vines with red grapes was represented, and the arbour burnt without being consumed: the colour of

the wood, fruit, and foliage, was also represented with astonishing exactness. The excellence of the Chinese artists, however, may be better conceived from a description of a spectacle of this nature which was exhibited by the emperor Chang-hi, for the diversion of his court. The fire-works commenced with six large cylinders planted in the ground, which sent forth so many streams of flame, rising to the height of twelve feet, and falling in beautiful showers. These were followed by a covered box, supported by two pillars, which threw up a shower of fire; several painted lanterns, and sentences written in large characters of burning sulphur; and six elegant branched candlesticks, with different tiers of lights, ranged in circles so brilliant as to disperse the darkness of the night. At last the emperor set fire to one of the works, and it was instantly communicated through an extent of eighty feet; the fire reached several poles and painted figures, whence proceeded a prodigious multitude of rockets; and at the same time a number of painted lanterns and branched candlesticks were lighted in all directions.—Smith's *Wonders.*

SHEPHERDS OF THE LANDES, IN THE SOUTH OF FRANCE.

The Landes, or desert in the South of France, is a tract of country between the mouths of the Adour and the Gironde, along the sea-coast, and, according to tradition, was once the bed of the sea itself, which flowed in as far as Dax. It is a bed of sand, flat, in the strictest sense of the word, and abounding with extensive pine woods. These woods afford turpentine, resin, and charcoal, for trade, as well as a sort of candles, used by the peasantry, made of yarn dipt in the turpentine. The road is through the sand, unaltered by art, except where it is so loose and deep as to require the trunks of the fir trees to be laid across to give it firmness. The villages and hamlets stand on spots of fertile ground, scattered like islands among the sands. The appearance of a corn-field on each side of the road, fenced by green hedges, a clump of trees at a little distance, and the spire of a rustic church taper-

FUNERAL CEREMONIES OF THE CHINESE.

ing from among them, gives notice of the approach to an inhabited spot.

The shepherds are mounted on stilts, and stride, like storks, along the flat. These stilts raise them from *three* to *five feet:* the foot rests on a surface, adapted to its sole, carved out of the solid wood; a flat part, shaped to the outside of the leg, and reaching to below the bend of the knee, is strapped round the calf and ankle. The foot is covered by a piece of raw sheep's hide. In these stilts they move with perfect freedom, and astonishing rapidity; and they have their balance so completely, that they run, jump, stoop, and even dance, with ease and safety. We made them run races for a piece of money, put on a stone on the ground, to which they pounced down with surprising quickness. They cannot stand quite still without the aid of a long staff, which they always carry in their hands. This guards them against any accidental trip, and when they wish to be at rest, forms a third leg, that keeps them steady. The habit of using the stilts is acquired early, and it appeared that the smaller the boy was, the longer it was necessary to have his stilts. By means of these odd additions to the natural leg, the feet are kept out of the water, which lies deep during winter on the sands, and from the heated sand during the summer: in addition to which, the sphere of vision over so perfect a flat is materially increased by the elevation, and the shepherd can see his sheep much farther on stilts than he could from the ground.

Once, when Napoleon was on a journey through the South of France, he travelled faster than his guard, which these shepherds observing, two hundred of them assembled about his carriage, formed a guard of honour, and kept pace with it on their stilts, at the rate of seven miles an hour for two hours together.

FUNERAL CEREMONIES OF THE CHINESE.

The funeral rites of the Chinese are considered as the most important of all their ceremonies, and persons receive more honour on the day of their death, than ever they did whilst alive. A few minutes after a man has ex-

pired, he is dressed in his richest apparel, adorned with every badge of his dignity, and placed in the coffin; which is generally made of very durable wood, varnished, and sometimes gilt. The preparation of a coffin, in which the body may be enclosed after death, is one of the chief objects of attention to a Chinese during his life, and great sums are often expended on it; so that the rich sometimes lay out a thousand crowns: the poorer classes will often expend all they are worth; and in cases of extreme poverty, a son will sell himself for a slave, in order to purchase a coffin for his father; which, perhaps, shall remain twenty or thirty years useless, but is considered as the most valuable piece of furniture belonging to a family. The manner of interment is as follows: first they sprinkle some lime on the bottom of the coffin, and lay the body on it, taking care to place the head on a pillow, and to add a great deal of cotton, that it may remain steady. The body should remain exposed seven days, but this time may be abridged, if any weighty reason makes it necessary; and during this interval all the friends who have been purposely invited, come and pay their respects to the deceased, the nearest relations remaining in the house. The coffin is then placed in the hall of ceremony, which is hung with white linen, interspersed with pieces of black or violet-coloured silk. Before the coffin is placed a table, on which stands the effigy of the deceased, or a carved ornament, inscribed with his name; and these are always accompanied with flowers, perfumes, and lighted tapers. In the mean time, all the sons of the deceased, clothed in linen and girded with cords, stand on one side of the coffin in a mournful posture, whilst the widow and her daughters stand on the other side, behind a curtain, from whence they occasionally send forth dismal cries. During the time that the corpse is thus kept, there are tables covered every morning with tea and sweetmeats; the persons who come to pay their respects are ushered in and out by a relation appointed for that purpose; and a large sheet of paper is hung over the gate, expressing the name and quality of the deceased, and giving a short detail of his life and actions.

On the day of burial, the relations are again assembled, and most of them attend the corpse to the place of sepul-

ture in the following order: A number of men march in file, carrying pasteboard figures of slaves, elephants, lions, tigers, &c. Others follow with flags, censers filled with perfumes, and tables of sweetmeats; while melancholy and plaintive airs are played on drums, bells, and other instruments. Immediately after the musicians follows the coffin, which is carried under a canopy of violet-coloured silk, neatly embroidered and covered with network. The eldest son, clothed in a canvass frock, having his body bent and leaning on a staff, follows near the coffin; behind him are his brothers, two and two, leaning on crutches, as if unable to support themselves; and the procession is closed with the mother and daughters, carried in close chairs, and all the other relations and friends of the deceased, in mourning. They all make great show of sorrow on this occasion, and deafen the spectators with their doleful cries; but M. Grosier observes, their lamentations are so methodical, that a European might easily suppose them to be merely the effects of art.

When they arrive at the place of interment, the coffin is deposited in a tomb appropriated for it; and at a small distance there are several temporary halls, with tables covered with provisions, and served up with great splendour to the mourners and attendants. The repast is sometimes followed by fresh marks of homage to the corpse, but these are generally dispensed with, and the company content themselves with complimenting the eldest son; who, however, answers only by signs. But if the deceased were a grandee of the empire, his relations do not leave the tomb for a month or two, but reside in apartments prepared for them, and renew their homage daily. The magnificence of these funerals is proportioned to the wealth or dignity of the deceased. That of one of the emperor's brothers was attended by upwards of sixteen thousand people, and each individual had a particular office assigned him in the ceremony.

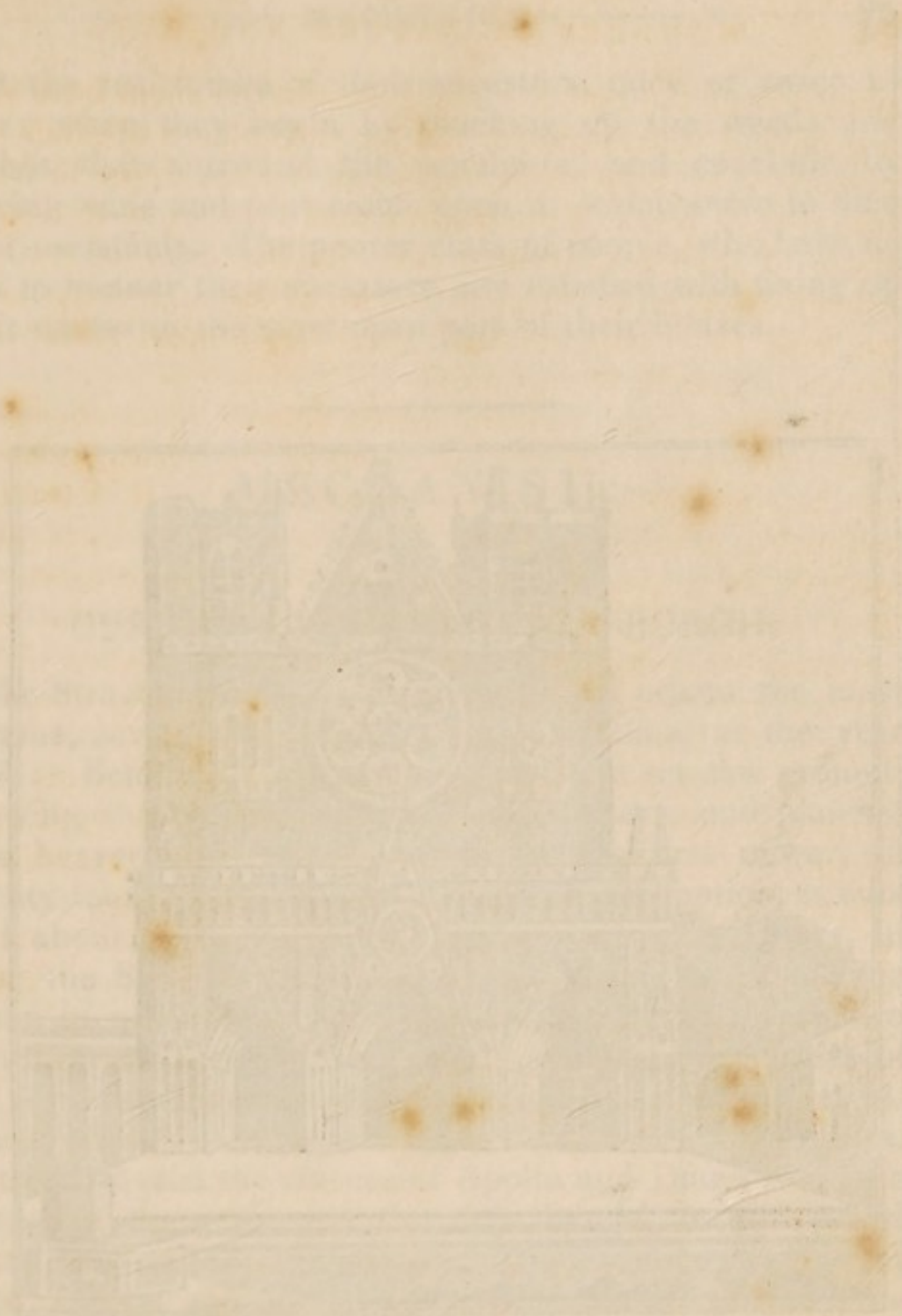
Some of the Chinese have carried their filial attachment so far as to retain their fathers' bodies for three or four years in their own houses; and impose upon themselves a number of humiliating duties, using no other seat, during the day, but a stool covered with white serge, and no other bed but a plain mat, made of reeds, which is usually

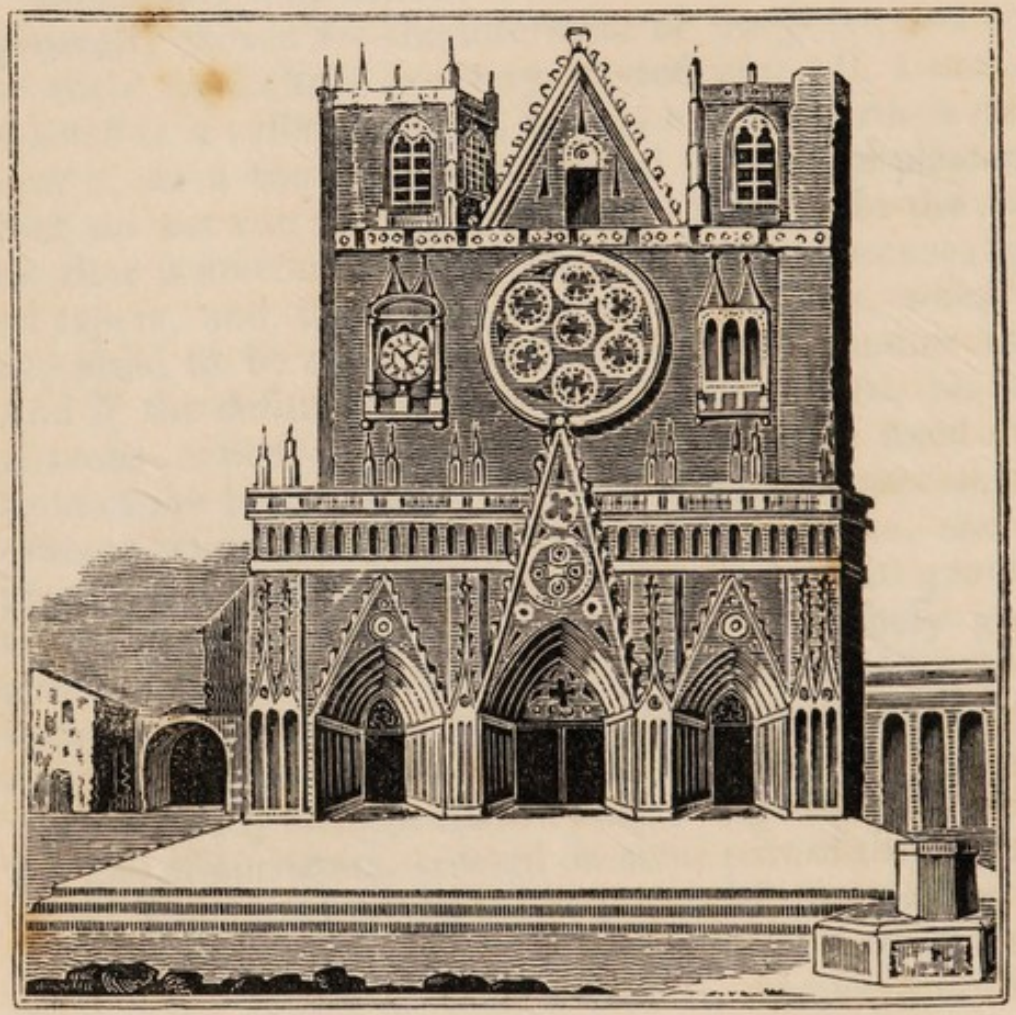
placed near the coffin. The generality of them have such a profound veneration for the burying-places of their ancestors, that no consideration can induce them to travel into remote parts of the world; and they seem to despise those of their countrymen who, for the sake of trade or other causes, go to reside in Sunda, or the adjacent islands, because they imagine that these men must leave their bones in unhallowed ground.

Mountains and solitary places remote from towns are generally chosen for the interment of the great, and some of their sepulchres are very magnificent. If a tomb be erected in a valley or plain, a large heap of earth is raised over it, as a tumulus, and covered with white plaster, so that no wet can penetrate the tomb below. In the vault an altar is erected, and covered with meats, incense, lighted tapers, and figures of slaves and animals, which are supposed to be serviceable to the dead in another state. And if the defunct held any considerable office, his most virtuous actions are engraved on marble and fixed up in front of the tomb; while a number of figures, representing officers, eunuchs, horses, stags, camels, lions, and elephants, are ranged round in different rows; and groves of aged cypresses preserve an awful and melancholy gloom about them, which is certainly calculated to make a deeper impression on the contemplative mind than the costly decorations of funeral monuments in Europe.

Each family of respectability has a large building, called the hall of ancestors, erected on some part of their estates, which is common for all the branches of that family. In this hall a long table is set against the wall, on which are painted the figures of their ancestors, who have rendered themselves illustrious by their talents, or filled some office under government with honour to themselves. Sometimes, however, it contains only the names of men, women, and children, belonging to the family, with their ages and dignities, inscribed upon tablets.

In spring, the relations assemble at this hall; and the wealthiest of them prepare a banquet which seems to have been originally designed for the dead; for they never touch any of the viands till an offering has been made with due solemnity. But exclusive of these annual entertainments, the Chinese consider themselves obliged to





CURIOUS CLOCK AT STRASBURGH

visit the real tombs of their ancestors, once or twice a-year; when they begin by plucking up the weeds and bushes that surround the sepulchre, and conclude by placing wine and provisions upon it, which serve to dine their assistants. The poorer class of people, who have no hall to honour their ancestors, are satisfied with fixing up their names in the most open part of their houses.

MECHANISM.

CURIOUS CLOCK AT STRASBURGH.

At Strasburgh there is a clock of all others the most famous, invented by Conradius Dasipodius, in the year 1571. Before the clock stands a globe on the ground, showing the motions of the heavens, stars, and planets. The heavens are carried about by the first mover, in twenty-four hours. Saturn, by his proper motion, is carried about in thirty years; Jupiter in twelve; Mars, in two; the Sun, Mercury, and Venus, in one year; and the Moon in one month. In the clock itself there are two tables on the right and left hand, shewing the eclipses of the sun and moon from the year 1573 to the year 1624. The third table in the middle, is divided into three parts. In the first part the statues of Apollo and Diana shew the course of the year, and the day thereof, being carried about in one year; the second part shews the year of our Lord, and the equinoctial days, the hours of each day, the minutes of each hour, Easter day, and all other feasts, and the dominical letter. The third part hath the geographical description of all Germany, and particularly of Strasburgh, and the names of the inventor and all the workmen. In the middle frame of the clock is an astrolabe, shewing the sign in which each planet is every day; and there are the statues of the seven planets upon a round piece of iron, lying flat; so that every day the planet that rules the day comes forth, the rest being hid within the frames, till they come out by course at their day; as the sun upon Sunday, and so for all the week. And

there is also a terrestrial globe, which shews the quarter, the half-hour, and the minutes. There is also the skull of a dead man, and statues of two boys, whereof one turns the hour-glass, when the clock hath struck, the other puts forth the rod in his hand at each stroke of the clock. Moreover, there are the statues of Spring, Summer, Autumn, and Winter, and many observations of the moon. In the upper part of the clock are four old men's statues, which strike the quarters of the hour; the statue of Death comes out at each quarter to strike, but is driven back by the statue of Christ, with a spear in his hand, for three quarters, but in the fourth quarter, that of Christ goes back, and that of Death strikes the hour, with a bone in his hand, and then the chimes sound. On the top of the clock, is an image of a cock, which twice in the day crows aloud, and claps his wings. Besides, this clock is decked with many rare pictures; and, being on the inside of the church, carries another frame to the outside of the walls, wherein the hours of the sun, the courses of the moon, the length of the day, and such other things, are set out with great art.—MORRISON'S *Itinerary*.

FINE CLOCK AT LYONS.

IN the magnificent cathedral, dedicated to St. John, at Lyons in France, is a most curious clock, justly celebrated for its surprising mechanism and motions. It is placed in an aisle near the choir. On the top stands a cock, which every three hours claps his wings and crows thrice. In a gallery underneath, a door opens on one side, out of which comes the Virgin Mary; and from a door on the other side, the Angel Gabriel, who meets and salutes her; at the same time a door opens in the alcove part, out of which the form of a dove, representing the Holy Ghost, descends on the Virgin's head. After which they return in again, and from a door in the middle comes a figure of a reverend father, lifting up his hands, and giving his benediction to the spectators. The days of the week are represented by seven figures, each of which takes place in a niche on the morning of the day it represents, and continues there till midnight. But perhaps the greatest curiosity is an *oval* plate, marked with the mi-

nutes of an hour, which are exactly pointed to by a hand reaching the circumference, which insensibly dilates and contracts itself during its revolution. This curious clock cannot be supposed to be so perfect in all its motions as it was formerly, and yet it has suffered as little as can be expected in a long course of years, through the care and skill of those appointed to look after it.

It appears by an inscription on the clock itself, that it was repaired and improved by one *Nourison*, in 1661; but it was contrived long before that time by *Nicholas Lipp*, a native of Basil, who finished it in 1598, when he was about 30 years of age. After which, it is said he had his eyes put out, by order of the magistrates of Lyons, that he might never be able to perform the like again. But this is so far from being true, that the magistrates engaged him to fix at Lyons, by allowing him a considerable salary to look after his own machine. The oval minute motion was invented by Mr. Servier, and is of later date.—THOMPSON'S *Travels.*

BEAUTIFUL CLOCK AT LUNDEN.

THE cathedral of Lunden, in Sweden, is a magnificent structure, and has a very lofty spire, which serves as a mark for sailors, being seen at a great distance.

The altar of this church is a beautiful piece of work; but what most engages the attention of a stranger is its curious clock, which, from the number of its movements and figures, may vie with those of Lyons and Strasburgh. Every hour two horsemen come out and encounter, and a door opens which discovers the Virgin Mary sitting on a throne with her divine infant in her arms, and the Magi with their retinue marching in order, and presenting their gifts, two trumpeters sounding all the time of the procession. This clock, besides the hour, shews the month and day, and every festival throughout the year.—SMITH'S *Wonders.*

CLOCKS IN THE FORM OF CHARIOTS.

SURPRISING as the mechanical wonders just described may seem to be, they appear to be excelled by two clocks

made a few years since, by an English artist, and sent as a present from the East India Company to the Emperor of China.

These clocks are in the form of chariots, in which are placed, in a fine attitude, a lady, leaning her right hand upon a part of the chariot; under which is a clock of curious workmanship, little larger than a shilling, that strikes, and repeats, and goes eight days. Upon her finger sits a bird finely modelled, and set with diamonds and rubies, with its wings expanded in a flying posture, and actually flutters for a considerable time on touching a diamond button below it; the body of the bird (which contains part of the wheels that in a manner give life to it) is not the bigness of the sixteenth part of an inch. The lady holds in her left hand a gold tube, not much thicker than a large pin, on the top of which is a small round box, to which a circular ornament set with diamonds, not larger than a sixpence, is fixed, which goes round near three hours, in a constant regular motion. Over the lady's head, supported by a small fluted pillar, no bigger than a quill, are two umbrellas; under the largest of which a bell is fixed, at a considerable distance from the clock, and seeming to have no connexion with it; but from which a communication is secretly conveyed to a hammer, that regularly strikes the hour, and repeats the same at pleasure, by touching a diamond button fixed to the clock below. At the feet of the lady is a gold dog, before which, from the point of the chariot, are two birds, fixed on spiral springs, the wings and feathers of which are set with stones of various colours, and appear as if flying away with the chariot, which, from another secret motion, is contrived to run in a straight, circular, or any other direction. A boy that lays hold of the chariot behind, seems also to push it forward. Above the umbrella are flowers and ornaments of precious stones, and it terminates with a flying dragon set in the same manner. The whole is of gold, most curiously executed, and embellished with rubies and pearls.

CURIOUS AUTOMATONS.

It is said that Archytas of Tarentum, 400 years before Christ, made a wooden pigeon that could fly; that Archi-

medes also made such automatons; that Regiomontanus made a wooden eagle that flew forth from the city, met the emperor, saluted him, and returned; also, that he made an iron fly, which flew out of his hand at a feast, and returned again after flying about the room. That Dr. Hook made the model of a flying chariot, capable of supporting itself in the air. Many other automatons have been exhibited in the present age, some of which we shall describe hereafter. Some figures have been formed that could write, and perform many other actions in imitation of animals. M. Vaucanson made a figure that played on the flute; the same gentleman also made a duck which was capable of eating, drinking, and imitating exactly the voice of a natural one; and, what is still more surprising, the food it swallowed was evacuated in a digested state, or considerably altered in the principles of solution; also the wings, viscera, and bones, were formed so as strongly to resemble those of a living duck, and the actions of eating and drinking shewed the strongest resemblance, even to the muddling the water with its bill.

M. Le Droz, of *La Chaux de Fonds*, in the province of Neufchatel, has also executed some very curious pieces of mechanism; one was a clock, presented to the King of Spain, which had, among other curiosities, a sheep that imitated the bleating of a natural one,—and a dog watching a basket of fruit, that barked and snarled when any one offered to take it away; besides a variety of human figures, exhibiting motions truly surprising.

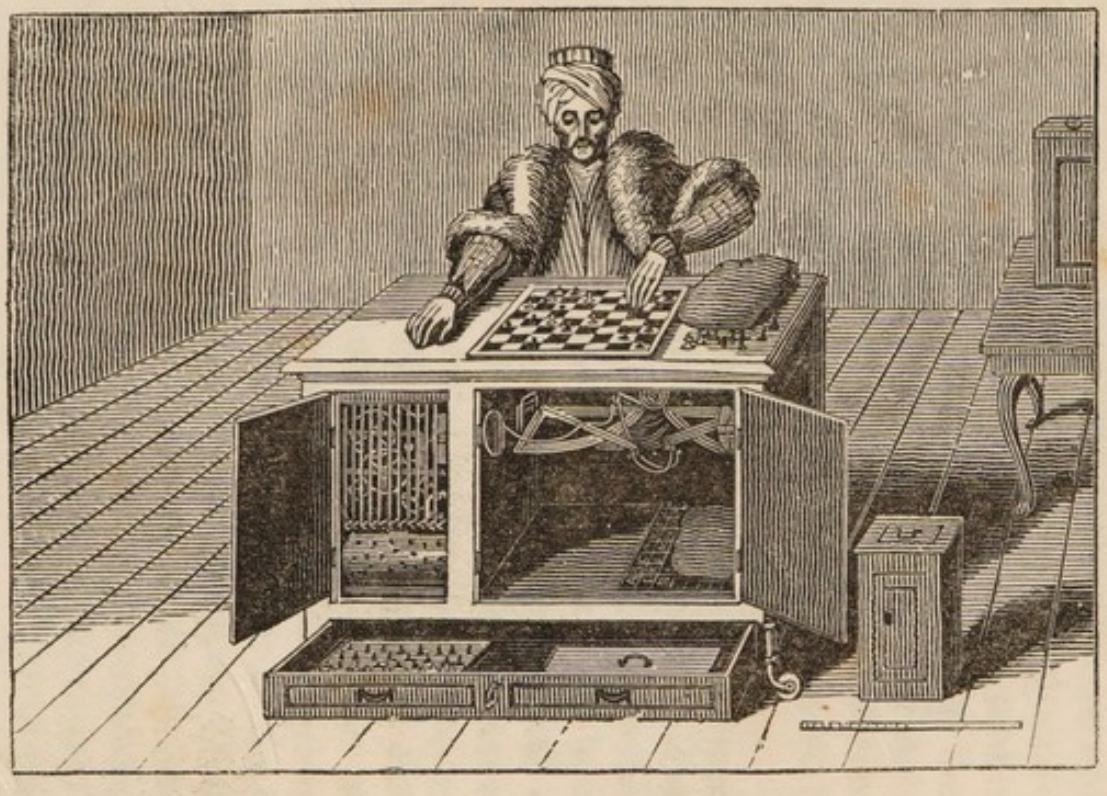
Another automaton of Droz's was the figure of a man, about the natural size, which held in the hand a metal style, and, by touching a spring that released the internal clock-work from its stop, the figure began to draw on a card; and, having finished its drawings on the first card, the figure rested, and then proceeded to draw different subjects on five or six other cards. The first card exhibited elegant portraits of the king and queen, facing each other; and the figure was observed to lift its pencil with the greatest precision, in the transition from one point to another, without making the least slur.

AUTOMATON CHESS-PLAYER.

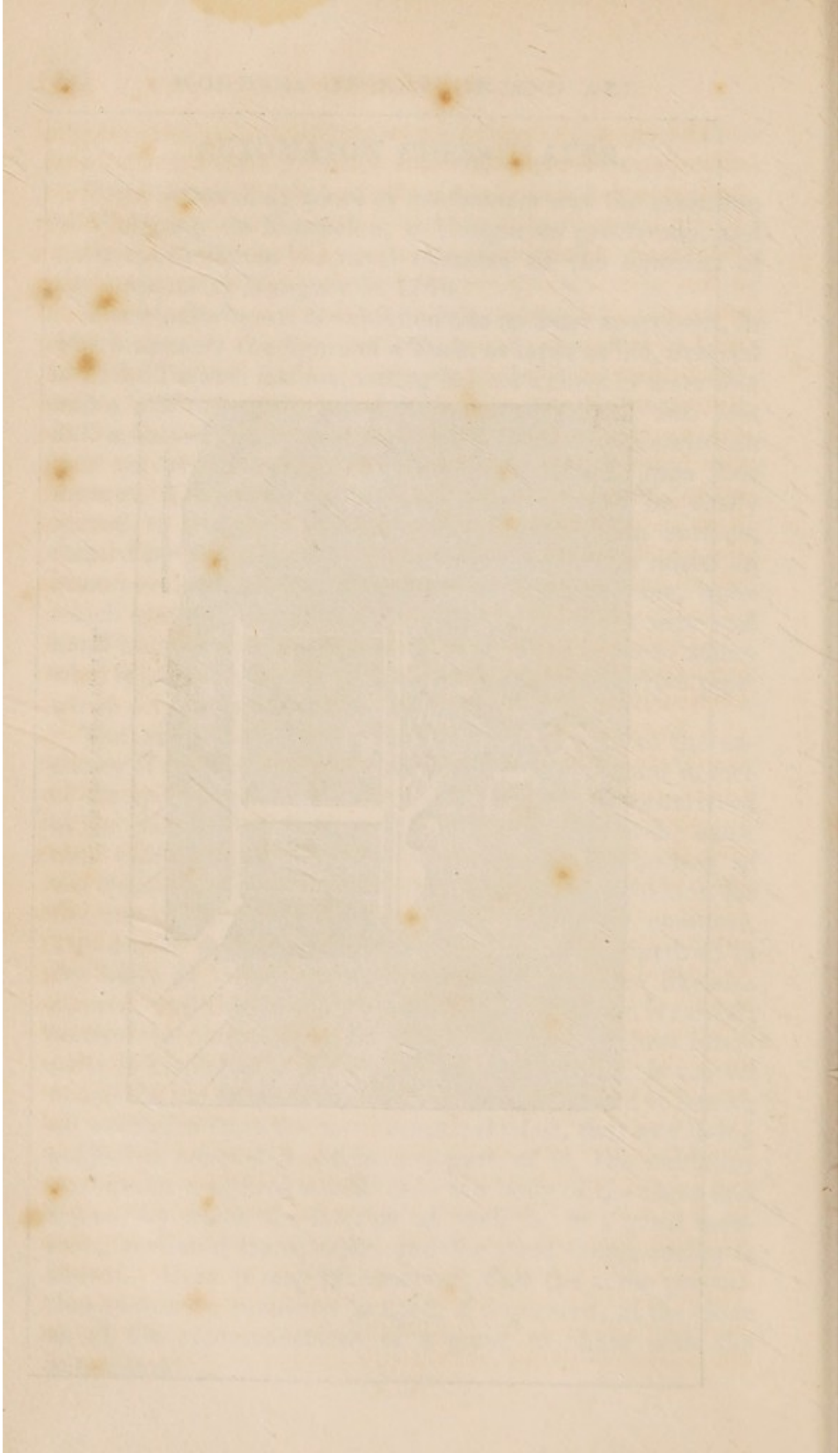
This astonishing piece of mechanism was the invention of Wolfgang de Kempelen, a Hungarian gentleman, and aulic counsellor to the royal chamber of the domains of the emperor in Hungary in 1769.

The room where it is exhibited has an inner apartment, in which appears the figure of a Turk, as large as life, dressed after the Turkish fashion, sitting behind a chest of three feet and a half in length, two feet in breadth, and two feet and a half in height, to which it is attached by the wooden seat on which it sits. The chest is placed upon four castors, and, together with the figure, may be easily moved to any part of the room. On the plain surface, formed by the top of the chest, in the centre, is raised an immoveable chess-board of handsome dimensions, upon which the figure has its eyes fixed; its right arm and hand being extended on the chest, and its left arm somewhat raised, as if in the attitude of holding a Turkish pipe, which originally was placed in its hands.

The exhibitor begins by wheeling the chest to the entrance of the apartment within which it stands, and in face of the spectators. He then opens certain doors contrived in the chest, two in front, and two at the back, at the same time pulling out a long shallow drawer at the bottom of the chest, made to contain the chess-men, a cushion for the arm of the figure to rest upon, and some counters. Two lesser doors, and a green cloth screen, contrived in the body of the figure and its lower parts, are likewise opened, and the Turkish robe which covers them is raised; so that the construction both of the figure and chest internally is displayed. In this state the automaton is moved round for the examination of the spectators; and to banish all suspicion from the most sceptical mind, that any living subject is concealed within any part of it, the exhibitor introduces a lighted candle into the body of the chest and figure, by which the interior of each is, in a great measure, rendered transparent, and the most secret corner is shewn. Here it may be observed, that the same precaution to remove suspicion is used, if requested, at the close as at the commencement of a game at chess with the automaton.



AUTOMATON CHESS PLAYER,



The chest is divided by a partition into two unequal chambers. That to the right of the figure is the narrowest, and occupies scarcely one third of the body of the chest. It is filled with little wheels, levers, cylinders, and other machinery used in clock-work. That to the left contains a few wheels, some small barrels with springs, and two quarters of a circle placed horizontally. The body and lower parts of the figure contain tubes, which seem to be conductors to the machinery. After a sufficient time, during which each spectator may satisfy his scruples and his curiosity, the exhibitor re-closes the doors of the chest and figure, and the drawer at bottom, makes some arrangements in the body of the figure, winds up the works with a key inserted into a small opening on the side of the chest, places a cushion under the left arm of the figure, which now rests upon it, and invites any individual present to play a game of chess.

In playing a game the automaton makes choice of the white pieces, and always has the first move. These are small advantages towards winning the game, which are cheerfully conceded. It plays with the left hand, the right arm and hand being constantly extended on the chest, behind which it is seated. This slight incongruity proceeded from absence of mind in the inventor, who did not perceive his mistake till the machinery of the automaton was too far completed to admit of the mistake being rectified. At the commencement of a game, the automaton moves its head, as if taking a view of the board; the same motion occurs at the close of a game. In making a move, it slowly raises its left arm from the cushion placed under it, and directs it towards the square of the piece to be moved. Its hand and fingers open on touching the piece, which it takes up, and conveys to any proposed square. The arm then returns with a natural motion to the cushion, upon which it usually rests. In taking a piece the automaton makes the same motions of the arm and hand to lay hold of the piece, which it conveys from the board; and then returning to its own piece, it takes it up, and places it on the vacant square. These motions are performed with perfect correctness; and the dexterity with which the arm acts, especially in the different operation of castling, seems to be the result

of spontaneous feeling, bending of the shoulder, elbow, and knuckles, and cautiously avoiding to touch any other piece than that which is to be moved, nor ever making a false move.

After a move made by its antagonist, the automaton remains for a few moments only inactive, as if meditating its next move; upon which the motions of the left arm and hand follow. On giving check to the king, it moves its head as a signal. When a false move is made by its antagonist, which frequently occurs through curiosity, to observe in what manner the automaton will act, (as, for instance, if a knight be made to move like a castle,) the automaton taps impatiently on the chest with its right hand, replaces the knight on its former square, and, not permitting its antagonist to recover his move, proceeds immediately to move one of its own pieces; thus appearing to punish him for his inattention. The little advantage in play which is hereby gained, makes the automaton more than a match for its antagonist; and seems to have been contemplated by the inventor as an additional resource towards winning the game.

It is of importance that the person matched against the automaton should be attentive in moving a piece, to place it precisely in the centre of the square, otherwise the figure, in attempting to lay hold of the piece, may miss its hold, or even sustain some injury in the delicate mechanism of the fingers. When the person has made a move, no alteration in it can take place; and if a piece be touched it must be played somewhere. This rule is strictly observed by the automaton. If its antagonist hesitates to move for a considerable time, it taps smartly on the top of the chest with the right hand, which is constantly extended upon it, as if testifying impatience at his delay.

During the time that the automaton is in motion, a low sound of clock-work running down is heard, which ceases soon after its arm returns to the cushion; and then its antagonist may make his move. The works are wound up at intervals, after ten or twelve moves, by the exhibitor, who is usually employed in walking up and down the apartment in which the automaton is shewn; approaching, however, the chest from time to time, especially

on its right side.—BLACKWOOD'S *Edinburgh Maaazine, February*, 1819.

[The Plate represents the machinery, opened for the purpose of shewing the internal movements, and that no deception is made use of: also, the Automaton deeply engaged in play, supposed to be in the act of placing one of the chess-men on the board.]

AUTOMATON MUSICIANS.

ONE of the most celebrated modern constructors of androides was M. Vaucanson, of the *Académie Royal des Sciences*. In 1738, he exhibited at Paris a machine capable of playing several airs on the German flute, of which he, in the same year, communicated an exact description and explanation to the academy, containing much curious information respecting the theory, as well as the practice, of that musical instrument.

This machine was a figure about five feet and a half in height, situated on the fragment of a rock, fixed upon a square pedestal, four feet and a half high, by three and a half broad. The front of the pedestal being opened, a clock-work movement was seen, by means of which a steel axis was made to revolve, having various protuberances upon it, to which were attached cords thrown over pulleys, and terminating in the upper boards of nine pairs of bellows, which were thus alternately raised and let down by the revolution of the axis. The disagreeable fluttering noise produced by the wind forcing open the valves of the bellows, was prevented by causing the valves to open by means of levers, which were acted upon by the tightening of the ropes which raised the upper boards of the bellows, and which, therefore, kept the valve open till the boards were allowed to descend. The nine pairs of bellows discharged their air into three different tubes, which ascending through the body of the figure, terminated in three small reservoirs in its trunk; these they united into one, which ascending to the throat, formed the cavity of the mouth To each of the three pipes three pairs of bellows were attached. The upper boards of one set were pressed down with a weight of four pounds, those of the second

set by a weight of two pounds, and those of the third by their own weight only.

Such were the expedients for supplying air to the flute-player; another piece of clock-work contained within the pedestal, was for the purpose of communicating the proper motions to his fingers, his lips, and his tongue. By this movement a cylinder was made to revolve, two feet and a half long, and sixty-four inches in circumference, which was divided into fifteen equal parts, of an inch and a half each. In these divisions were inserted various pegs and staples of brass, which raised and depressed the ends of fifteen different levers, similar to those which produce the sounds of a common barrel organ. Seven of these levers regulated the motions of the seven fingers required to stop the holes of a German flute, with which they communicated by means of steel chains ascending through the body of the figure, and directed by means of pulleys into the proper angles at the shoulder, elbow, &c. Three of the levers regulated the ingress of the air, being connected with the valves of the three reservoirs in the body of the figure, which they opened and shut at pleasure, so as to produce a stronger or weaker, a louder or lower tone. By a similar contrivance, four of the levers served to give the proper motions to the lips, so as to allow a freer passage to the air; another contracted them, so as to diminish the efflux of air; the third drew them backwards from the orifice of the flute, and the fourth pushed them forwards. The remaining lever was employed in the direction of the tongue, to which it gave motion, in such a manner as to open and shut the mouth of the flute at pleasure. This mechanism, with other ingenious contrivances enabled M. Vaucanson to produce all the motions requisite for an expert player on the flute, and which he executed in such a manner as to produce music equal in beauty to that derived from the exertions of a well-practised living performer. The same gentleman afterwards exercised his ingenuity in the construction of another musical androides, exhibited to the academy in 1741, and which was not less admired than his flute-player.

This was a mechanical performer on the pipe and tabor, fixed, like the flute-player, on a pedestal, habited like a dancing shepherd, and capable of playing about twenty

airs, consisting of minuets, rigadoons, and country dances.—BREWSTER'S *Edinburgh Encyclovedia.*

AUTOMATON SEATED AT A PIANO-FORTE.

AMONG the most celebrated automatical mechanics of the present day is M. Maillardet, a native of Switzerland, who has constructed several androides of unrivalled excellence. One of these represents a beautiful female seated at a piano-forte, on which she performs eighteen tunes. Independent of the expression of the music which is produced by the actual pressure of her fingers on the keys, all her motions are elegant and graceful, and so nearly imitating life, that, even on a near approach, the deception can hardly be discovered. Before commencing a tune, she makes a gentle inclination with her head, as if saluting the auditors; and remains seemingly intent on the performance. Her bosom heaves, her eyes move, and appear as naturally to follow her fingers over the keys, as if it were real animation. The hands regulate the natural tones only, for the flats and sharps are played by pedals, on which the feet operate. It is likewise, to be observed, that although the instrument resembles a piano-forte, it is in fact an organ, the bellows of which are blown by particular parts of the machinery. The movements of this figure are effected by means of six large springs, which, when completely wound up, will preserve their action during an hour. The various parts composing the machinery are extremely nice and complicated, and all admirably adapted to the purposes required. Twenty-five leaders, or communications, produce the different motions of the body, and others, proceeding from the centre of motion, are distributed to the different parts of the instrument. A brass fly regulates and equalizes the whole. The figure is so contrived for the convenience of removal, that it divides in the middle. It is enclosed in a large glass case, and rests above a mahogany box containing the machinery, which the artist throws open for universal inspection. It was valued by him at fifteen hundred or two thousand pounds, which may in some respect prove the extent of the labour and ingenuity in framing it.—BREWSTER'S *Encyclopedia.*

AUTOMATON TARANTULA SPIDER.

THIS surprising piece of mechanism, made of steel, is now exhibiting at Weeks's museum, Titchborne-street, Piccadilly. This singular automaton comes independently out of a box, and runs backward and forward on a table; stretches out and draws in its paws, as if at will; moves its horns and claws, and opens them with ease.

This wonderful little figure must fix the attention of the curious, having no other power of action than the mechanism contained in its body. The thing might have been thought impossible, on account of its smallness, and the difficulty of putting together, it being composed of *one hundred and fifteen* different pieces.

AUTOMATON OPERA.

TOWARDS the end of the 17th century, Father Truchet, of the Royal Academy of Sciences, constructed for the amusement of Louis XIV., an automaton, consisting of a kind of moving pictures, which was considered as a masterpiece in mechanics. One of these pictures, which the monarch called his *little opera*, represented an opera in five acts, and changed the decorations at the commencement of each. The actors performed their parts in pantomime. This moving picture was only 16½ inches in breadth, 13 inches 4 lines in height, and one inch 3 lines in thickness for the play of the machinery. The representation could be stopped at pleasure, and made to re-commence at the same place by the operation of a catch.—*Edinburgh Encyclopedia.*

AUTOMATON COACH AND HORSES.

A MORE extraordinary piece of mechanism than the foregoing, is that described by M. Camus, who says he constructed it for the amusement of Louis XIV., when a child. It consisted of a small coach drawn by two horses, in which was the figure of a lady, with a footman and page behind. According to the account given by M.

Camus himself, this coach being placed at the extremity of a table of a determinate size, the coachman smacked his whip, and the horses immediately set out, moving their legs in a natural manner. When the carriage reached the edge of the table, it turned at a right angle, and proceeded along that edge. When it arrived opposite to the place where the king was seated, it stopped, and the page getting down opened the door, upon which the lady alighted, having in her hand a petition, which she presented with a curtsey. After waiting some time, she again curtsied, and re-entered the carriage; the page then resumed his place, the coachman whipped his horses, which began to move, and the footman, running after the carriage, jumped up behind it, and the carriage drove on.—*Edinburgh Encyclopedia.*

WRITING AUTOMATON.

M. MAILLARDET constructed a writing boy, who is exhibited kneeling on one knee, and an attendant having dipped his pencil and laid the paper before him, he executes drawings, and French and English sentences, in writing, of a very superior description. Every natural motion of the fingers, elbow, eyes, &c. is correctly imitated. The first of these figures the artist stated to have cost him the sum of £1,500 in its construction.

AUTOMATON SINGING BIRD.

M. MAILLARDET, an artist whom we have before mentioned, constructed an oval box, about three inches in length; the lid flew up, and a bird of beautiful plumage, not larger than a small humming bird, started up from its nest. Its wings fluttered, and its bill opening with the tremulous vibration peculiar to singing birds, it began to warble. After continuing a succession of notes, which would fill a large apartment, it darted down into its nest, and the lid closed of itself. The machinery was here contained in a very narrow compass, and could produce four different kinds of warbling: it was put in motion by springs, which preserved their action during four minutes

It has often created great surprise how such a variety of notes could be produced within a space where there was evidently no room for a corresponding number of pipes. The artist, however, has accomplished his purpose, by a very simple expedient. There is only one tube, the vacuity of which is shortened or lengthened by a piston working inside, and thus producing sounds graver or more acute, according as the machinery operates upon it.—*Edinburgh Encyclopedia.*

REMARKABLE REPEATING WATCH.

In the Academy of Sciences at St. Petersburgh, in Russia, is a repeating watch, about the size of an egg. Within is represented our Redeemer's tomb, with the stone at the entrance, and the sentinels upon duty; and, while a spectator is admiring this curious piece of mechanism, the stone is suddenly removed, the sentinels drop down, the angels appear, the women enter the sepulchre, and the same chant is heard, which is performed in the Greek church on Easter-Eve.—Smith's *Wonders.*

MINIATURE WATCH IN A RING.

June the 4th, 1764, Mr. Arnold, of Devereux-court, in the Strand, watch-maker, had the honour to present his late majesty George III. with a most curious repeating watch of his own construction, set in a ring. The size of the watch is something less than a silver twopence; it contains one hundred and twenty different parts, and weighs altogether no more than five pennyweights, seven grains, and three-fourths.—*Annual Register*, 1764.

THE FIRST TIME-PIECES, MENTIONED IN HISTORY.

"To mark the flight of time by external and sensible representations, and so distinguish the passing hours into regular periods and stages, was the first work of *Him* who

appointed the revolutions of the night and day, the returns of the sabbath, the variations of the moon, the vicissitudes of the seasons, and the courses of the sun. But to ascertain the uniform progress of the day by the uniform motion of shades and substances, is an invention as curious in its nature, as it was probably late in its discovery. And yet it was made before the days of Ahaz, the monarch of Judea, and above two hundred years before the first inhabitation of Lancashire. This primitive dial seems to have been merely a diagram, which was described upon the steps of Ahaz's palace, and marked the advance of the day by the shade of some neighbouring body moving over the face of it. And the contrivance seems to have remained the only dial of the eastern nations for a couple of centuries afterward, and first received the addition of a gnomon from the hand of Anaximenes, the Milesian, at Sparta. But the knowledge of this or the other was introduced very late into the west, The Romans distinguished the day only by its two natural periods of sun-rise and sun-set, even for some time after the promulgation of the twelve tables. And the first artificial division of it was by the obvious distinction of noon. This began a few years afterward, the crier of the consuls being ordered to proclaim the noon in their court, when he saw the sun appear betwixt two particular points of the forum. But the Grecian dial passed with the Grecian colonies into Sicily; and the earliest that was seen at Rome was brought from the conquered Catania during the first Punic war, and fixed upon a pillar by the rostrum. This, however, was inaccurately made, the lines not answering with precision to the hours. But it remained the irregular standard of the Roman time for no less than ninety-nine years; and, within five after it was reformed, Scipio Nasica invented a horologe, which could be serviceable on the frequent occasions in which the other was useless, and marked the several stages of time, as well under a cloudy as a sunny sky, and equally in the night as the day. This was a large vessel that measured the course of the hours by the trickling of water, and was set up under cover by Scipio for the use of the public. But the Britons were as ignorant of both at the period of the Roman invasion, as the Romans at the commencement of

the Punic wars; and the first of the latter that was ever brought into the island was introduced into it by Cæsar and his army, in his two attempts upon the country. Both were introduced into Britain by the Romans, and both were for ages the only registers of the day in Manchester: and the one has, therefore, received the appellation of horarium, or an hour-glass,—and the other the name of a diale, a dial, or day-piece, among us.—WHITTAKER'S *History of Manchester*.

REMARKABLE SUN-DIAL AT MILTON CHURCH, NEAR GRAVESEND.

OVER the porch, and close to the road leading from Gravesend to Rochester, a few years ago, was erected a south dial, west eight degrees, with its furniture, constructed by Mr. Giles, master of Gravesend Free School. The curve lines (which are conical sections) that run across the dial, are called parallels of the length of the day, and are eleven in number; the uppermost is the tropic of Capricorn, and is marked at both ends with its proper character. The others next below are numbered 8, 9, 10, 11; and that with 12 is the equinoctial line, and has at one end the sign of Aries, at the other end the sign Libra. The other lines below these are marked 13, 14, 15, 16; and the lowest line is the tropic of Cancer, distinguished at both ends with its proper character. By the shadow of a small ball, which is fixed on the style called *Nodus*, the several length of days are pointed out; as, for example, when the shadow of the ball falls upon the upper line, the day is the shortest; when it falls on the next lower line, marked 8, the day is eight hours long; when on the line marked 9, the day is nine hours long; and so of the rest: and when the shadow of the ball arrives at the lowermost line, the day is the longest. The vertical, or upright, lines are called Azimuth lines, and are marked at the bottom with the letters that denote the points of the compass; so that when the shadow of the ball falls on any one of these lines, it shews the sun is upon *that* point of the compass which the letters denote that correspond with the line.

MECHANICAL THEATRE.

THIS curious piece of mechanism exhibited at Paris is thus described by the Rev. Mr. Evans:

The spectacle in the *Picturesque and Mechanical Theatre* consisted of scenery, and appropriate little moving figures. The first scene was a view of a wood in early morning; every object looked blue, fresh, and dewy. The gradations of light, until the approach of meridian day, were admirably represented. Serpents were seen crawling in the grass. A little sportsman entered with his fowling-piece, and imitated all the movements natural to his pursuits; a tiny wild-duck rose from a lake, and flew before him. He pointed his gun, and changed his situation,—pointed again, and fired: the bird dropped; he threw it over his shoulders, fastened his gun, and retired. Waggons, drawn by horses four inches high, passed along; groups of peasantry followed, exquisitely imitating all the indications of life. Amongst several other scenes was a beautiful view of the Bay of Naples, and the great bridge, over which little horses with their riders passed in the various paces of walking, trotting, and galloping. All the minutiæ of nature were attended to. The ear was beguiled with the patting of the horses' hoofs upon the pavement; and some of the little animals reared, and ran before the others. There were, also, some charming little sea pieces, in which the vessels sailed with their heads towards the spectators, and manœuvred in a surprising manner. The whole concluded with a storm, and shipwrecked sailors were seen floating in the water, then buried in the surge. One of them rose again, and reached a rock. Boats put off to his relief, and perished in the attempt. The little figure was seen displaying the greatest agonies. The storm subsided: tiny persons appeared upon the top of a projecting cliff, near a watch-tower, and lowered a rope to the little sufferer below, which he caught, and, after ascending to some height by it, overwhelmed by fatigue, lost his hold. After recovering from the fall, he renewed his efforts, and at length reached the top in safety, amidst the acclamations of the spectators.—EVANS'S *Juvenile Tourist.*

SILK MILL AT DERBY.

DERBY has a Silk Mill on the river, erected by Sir Thomas Loombe, who, at an immense expense, and great hazard, brought the model from Italy. It is fixed in a large house, six stories high, and consists of 26,585 wheels, with 97,746 movements, all driven by one large water wheel fixed on the outside of the house. It goes round three times in one minute, and each time works 73,726 yards of silk thread, so that in twenty-four hours, it works 318,496,320 yards of silk thread, under the management of only one regulator. It has been of such service to the silk trade, that Sir Thomas had the benefit of it during his life; but the parliament having allowed him 14,000*l.* as a further reward for his services, he suffered a model of it to be taken. This model now lies in the Record-office at the Tower, for the benefit of the public, any person being allowed to inspect it, so that there are at present several mills of the kind erected in different parts of the kingdom.—EVANS'S *Juvenile Tourist.*

BUONAPARTE'S MILITARY CARRIAGE.

IT is a curious fact, that the fall of this memorable chieftain may be traced to the hour in which he entered the vehicle here described, which was publicly exhibited for several months at Bullock's Museum, Piccadilly. It was as fatal to him as the chariots of the sun had been to Phaëton. The vehicle remains, but what has become of the charioteer? It was this carriage that conveyed Napoleon to the shore of France at his former exile; it was in this that he made his excursions in Elba; in it he returned to his recovered capital; and it was this which bore him to the fatal field of Waterloo!

These circumstances and reflections present themselves with peculiar force to the mind, when the object itself is brought within view, as well as under contemplation.

The exterior of the carriage is, in many respects, very like the modern English travelling chariots. The colour is a dark blue, with a handsome bordered ornament in gold; but the imperial arms are emblazoned on the pan-

nels of the doors. It has a lamp at each corner of the roof, and there is one lamp fixed at the back, which can throw a strong light into the interior.

In the front there is a great projection; the utility of which is very considerable. Beyond this projection, and nearer to the horses, is a seat for the coachman. This is ingeniously contrived so as to prevent the driver from viewing the interior of the carriage; and it is also placed so as to afford to those who are within, a clear sight of the horses, and of the surrounding country. There are two sabre cuts, which were aimed at the coachman when the carriage was taken.

The pannels of the carriage are bullet proof; at the hinder part is a projecting sword case; and the pannel at the lower part of the back is so contrived, that it may be let down, and thereby facilitate the addition or removal of conveniences, without disturbing the traveller.

The under-carriage, which has swan-neck iron cranes, is of prodigious strength; the springs are semicircular, and each of them seems capable of bearing half a ton; the wheels, and more particularly the tire, are also of great strength. The pole is contrived to act as a lever, by which the carriage is kept on a level in every kind of road. The under-carriage and wheels are painted in vermilion, edged with the colour of the body, and heightened with gold. The harness is very little worthy an imperial equipage; it bears strong marks of its service in the Russian campaign, and its former uses are to be recognised only by the bees, which are to be seen in several places.

The interior deserves particular attention, for it is adapted to the various purposes of a kitchen, a bed-room, a dressing-room, an office, and an eating-room.

The seat has a separation; but whether for pride or convenience, can only be conjectured.

In front of the seat are compartments for every utensil of probable utility; of some there are two sets, one of gold, the other of silver. Among the gold articles are a tea-pot, coffee-pot, sugar-basin, cream-ewer, coffee-cup and saucer, slop-basin, candlesticks, wash-hand basin, plates for breakfast, &c.; each article is superbly embossed with the imperial arms, and engraved with his favourite N: and by the aid of the lamp, any thing could be heated in the carriage.

Beneath the coachman's seat is a small box, about two feet and a half long, and about four inches square; this contains a bedstead of polished steel, which could be fitted up within one or two minutes; the carriage contained mattresses, and the other requisites for bedding, of very exquisite quality; all of them commodiously arranged. There are also articles for strict personal convenience, made of silver, fitted into the carriage.

A small mahogany case, about ten inches square by eighteen long, contains the peculiar *nécessaire* of the ex-Emperor. It is somewhat, in appearance, like an English writing-desk; having the imperial arms most beautifully engraved on the cover. It contains nearly one hundred articles, almost all of them of solid gold.

The liquor case, like the nécessaire, is made of mahogany; it contains two bottles; one of them still has the rum which was found in it at the time; the other contains some extremely fine old Malaga wine. Various articles of perfumery are among the luxuries which remain; and notwithstanding Napoleon's wish to discourage British manufactures, there are nevertheless some Windsor soap, and some English court plaster; of eau de Cologne, eau de lavande, salt spirit, *&c.*, there are sufficient to show, that perfumers were not disregarded.

There is a writing-desk, which may be drawn out so as to write whilst the carriage is proceeding; an inkstand, pens, *&c.*, were found in it; and here was found the ex-Emperor's celebrated portfolio.

In the front there are also many smaller compartments, for maps and telescopes; on the ceiling of the carriage is a net-work for carrying small travelling requisites.

On one of the doors of the carriage are two pistol holsters, in which were found pistols, that had been manufactured at Versailles; and in a holster, close to the seat, a double barrelled pistol was also found; all the pistols were found loaded. On the side there hung a large silver chronometer with a silver chain; it is of the most elaborate workmanship.

The doors of the carriage have locks and bolts; the blinds, behind the windows, shut and open by means of a spring, and may be closed so as to form a barrier almost impenetrable.

On the outside of the front windows is a roller-blind made of strong painted canvass; when pulled down, this will exclude rain or snow, and therefore secure the windows and blinds from being blocked up, as well as prevent the damp from penetrating.

All the articles which have been enumerated, still remain with the carriage; but when it was taken, there were a great number of diamonds, and treasure, in money, &c., of immense value.—BULLOCK'S *Curiosities.*

CURIOUS CLEPSYDRA, OR WATER-CLOCK.

THE clock presented by the Kalif Haroun-al-Rashid to the French Emperor Charlemagne, deserves to be mentioned as a remarkable piece of ingenuity, considering the time at which it was made. It was a Clepsydra, a clock moved by water. In the dial were twelve small doors, forming the divisions of the hours; and each of these doors opened in succession at the hour marked, and let out little balls, which, falling on a brazen bell, struck the hour. The doors continued open till twelve o'clock, when twelve little knights, mounted on horseback, came out together, paraded round the dial, and shut all the doors.—*Edinburgh Encyclopedia.*

STEAM-CARRIAGE BY MR. GURNEY.

MR. Goldsworthy Gurney, after a variety of experiments, during the last two years, has completed a Steam-Carriage on a new principle. As regards the safety of the present invention, it is stated, that, even from the bursting of the boiler, there is not the most distant chance of mischief to the passengers. The boiler is tubular, constructed upon philosophical principles, and upon a plan totally distinct from any thing previously in use. Instead of being, as in ordinary cases, a large vessel closed on all sides, with the exception of the valves and steam conductors, which a high pressure or accidental defect may burst, it is composed of a succession of welded iron pipes, perhaps forty in number, screwed together in the manner of the common gas-pipes, at given distances, extending in a direct line, and in a row, at equal distances from a small

reservoir of water, to the distance of about a yard and a half, and then curving over in a semi-circle of about half a yard in diameter, returning in parallel lines to the pipes beneath, to a reservoir above, thus forming a sort of inverted horse-shoe. This horse-shoe of pipes, in fact, forms the boiler, and the space between is the furnace; the whole being inclosed with sheet-iron. The advantage of this arrangement is obvious; for, while more than a sufficient quantity of steam is generated for the purposes required, the only possible accident that could happen would be, the bursting of one of these barrels, and a temporary diminution of the steam-power of one-fortieth part. The effects of the accident could, of course, only be felt within its own inclosure; and the engineer could, in ten minutes, repair the injury, by extracting the wounded barrel, and plugging up the holes at each end; but the fact is, that such are the proofs to which these barrels are subjected, before they are used, by the application of a steam-pressure five hundred times more than can ever be required, that the accident, trifling as it is, is scarcely possible.

A contemporary journal illustrated Mr. Gurney's invention by the following analogy:—"It will appear not a little singular that Mr. Gurney, who was educated a medical man, has actually made the construction of the human body, and of animals in general, the model of his invention. His reservoirs of steam and water, or rather '*separators*,' as they are called, are, as it were, the heart of his steam apparatus, the lower pipes of the boiler are the arteries, and the upper pipes the veins. The water, which is the substitute for blood, is first sent from the reservoirs into the pipes—the operation of fire soon produces steam, which ascends through the pipes to the upper part of the reservoir, carrying with it a portion of water into the separators, which of course descends to the lower part, and returns to fill the pipes which have been exhausted by the evaporation of the steam—the steam above pressing it down with an elastic force, so as to keep the arteries or pipes constantly full, and preserve a regular circulation. In the centre of the separators are perforated steam pipes, which ascend nearly to the tops, these tops being of course closed so as to prevent the

escape of the steam. Through these pipes the steam descends with its customary force, and is conducted by one main pipe all along under the carriage to the end of the platform, which is, in point of fact, the *water tank*, where it turns under till it reaches two large branch pipes which communicate with the cylinders, from which the pistons move and give motion to the machinery. The cranks of the axle are thus set in action, and the rotatory movement is given to the wheels. By the power thus engendered also a pump is worked, and which, by means of a flexible hose, pumps the water into the boiler, keeping the supply complete. The tank and furnace, it is calculated, will hold sufficient water and fuel for one hour's consumption, the former being sixty gallons."

The vehicle resembles the ordinary stage-coaches, but is rather larger and higher. Coke or charcoal are to form the fuel, by which means smoke will be avoided; the flues will be above the level of the seated passenger, and it is calculated that the motion of the carriage will always disperse the heated rarefied air from the flues.

The present carriage would carry six inside and fifteen outside passengers, independent of the guide, who is also the engineer. In front of the coach is a very capacious boot; while behind, that which assumes the appearance of a boot is the case for the boiler and the furnace. The length of the vehicle, from end to end, is fifteen feet, and, with the pole and pilot-wheels, twenty feet. The diameter of the hind wheels is five feet; of the front wheels three feet nine inches; and of the pilot-wheels three feet. There is a treble perch, by which the machinery is supported, and beneath which two propellers, in going up a hill, may be set in motion, somewhat similar to the action of a horse's legs under similar circumstances. In descending a hill, there is a break fixed on the hind wheel to increase the friction; but independent of this, the guide has the power of lessening the force of the steam to any extent, by means of the lever to his right hand, which operates upon what is called the *throttle valve*, and by which he may stop the action of the steam altogether, and effect a counter vacuum in the cylinders. By this means also he regulates the rate of progress on the road,

going at a pace of two miles or ten miles per hour, or even quicker if necessary. There is another lever, also, by which he can stop the vehicle *instanter*, and, in fact, in a moment reverse the motion of the wheels, so as to prevent accident, as is the practice with the paddles of steam-vessels. The guide, who sits in front, keeps the vehicle in its proper course, by means of the pilot-wheels acting upon the pole, like the handle of a garden-chair.

The weight of the carriage and its apparatus is estimated at $1\frac{1}{2}$ ton, and its wear and tear of the road, as compared with a carriage drawn by four horses, is as one to six. When the carriage is in progress the machinery is not heard, nor is there so much vibration as in an ordinary vehicle, from the superior solidity of the structure. The engine has a twelve-horse power, but may be increased to sixteen; while the actual power in use, except in ascending a hill, is but eight-horse.

The success of the present improved invention is stated to be decided; but the public will shortly have an opportunity of judging for themselves, as several experimental journeys are projected. If it should attain its anticipated perfection, the contrivance will indeed be a proud triumph of human ingenuity, which, aided by its economy, will doubtless recommend it to universal patronage. Mr. Gurney has already secured a patent for his invention; and he has our best wishes for his permanent success.

STEEL CHAIR,

Made for the Emperor Rodolphus II. *of Germany, now in the Possession of the Earl of Radnor.*

This chair was a present from the city of Augsburgh to the Emperor Rodolphus II., about the year 1575. The artist's name was Thomas Rukes. The large compartment at the back of it represents Nebuchadnezzar asleep, and the image about which he dreamed is standing before him; and just adjoining is a representation of the king on his throne, and Daniel before him explaining the dream.

The work wrought on the chair is well known to be

descriptive of the four great monarchies of the world, viz., the Babylonian, Persian, Grecian, and Roman. The head of the Roman empire the emperors of Germany affect to be, and in compliment to Rodolphus, the history is deduced (by a representation in the several compartments, of which there are more than one hundred and thirty of select and remarkable events immediately connected with it) from the destruction of the city of Troy, to the time of the then emperor himself.

This chair was thirty years in making, and is said to have cost forty thousand pounds. The four figures missing at the bottom of the chair, some assert were never there, and that it was originally in this respect incomplete; but this does not seem probable, and can only be conjecture.

This chair was the property of the celebrated Count Tassin, who was ambassador from the court of Sweden to the English court; his son, Gustavus Brander, Esq., bought it for eighteen hundred guineas, who sold it to the Earl of Radnor for six hundred guineas.—*Cabinet of Curiosities.*

REMARKABLE ANIMALS.

THE HORSE.

The noblest conquest ever made by man over the brute creation, is the reduction of this spirited and haughty animal, which shares with him the fatigues of war, and the glory of victory. Equally intrepid as his master, the horse sees the danger, and encounters death with bravery; inspired at the clash of arms, he loves it, and pursues the enemy with the same ardour and resolution. He feels pleasure also in the chase and in tournaments; in the course he is all fire, but equally tractable and courageous he does not give way to his impetuosity, and knows how to check his natural and fiery temper. He not only submits to the arm which guides him, but seems to consult the desires of his rider; and always obedient to the in-

pression he receives, he presses on or stops, at his rider's pleasure. The horse is a creature which renounces his very being for the service of man, whose will he even knows how to anticipate, and execute by the promptitude of his movements: he gives himself up without reserve, refuses nothing, exerts himself beyond his strength, and often dies sooner than disobey.

Such is the horse, whose talents and natural qualities art has improved, and who with care has been tutored for the service of man: his education commences with the loss of his liberty, and is finished by constraint.—The slavery or servitude of horses is so universal, and so ancient, that we rarely see them in their natural state. They are always covered with harness when at work, and no wholly free from their bonds even in time of rest. If they are sometimes suffered to range in the fields, they always bear about them marks of servitude, and frequently external impressions of labour and of pain: the mouth is deformed by the wrinkles occasioned by the bit, the sides scarred with wounds inflicted by the spurs, and the hoofs are pierced with nails. The attitude of the body, constrained by the impression of habitual shocks, from which they would be delivered in vain, as they would not be more at liberty. Even those whose slavery is the most gentle, who are only fed and broke for luxury and magnificence, and whose golden chains only serve to satisfy the vanity of their masters, are still more dishonoured by the elegance of their trappings, and by the plaits of their manes, than by the iron shoes of their feet.

These beautiful and noble creatures are never seen to leave our dwellings for the forests and deserts; but, on the contrary, express the greatest desire of returning to their stables, though all they meet with there is a gross food, always the same, and generally measured out rather by parsimony than their craving appetites; but the kind treatment they generally meet with compensates for their other losses. When spent with fatigue, the place of rest is a place of delight; they smell it from afar; they find it out in the midst of the most crowded cities, and seem, in every thing, to prefer servitude to freedom. The habits they have contracted become a kind of second nature,—horses left in the woods having been known to keep a continual

neighing, in order to be heard, and at the voice of man have ran to him with transport; and, amidst a rich variety of agreeable nourishment, while deprived of human society, they have been known to lose their flesh, and to become strangely emaciated in a very short time.—BUFFON'S *Natural History*.

It is recorded of the celebrated Howard, that his old horses remained, after they were incapable of labour, the happy pensioners on his bounty for the rest of their lives. These faithful creatures enjoyed themselves in perfect freedom from toil, and in full supply of all that old age requires, several fields having, by their generous master, been appropriated for that purpose. Each of these fields had a comfortable shed, to which the inhabitants could resort in the bad weather, and were sure of finding the rigours of the season softened by a well-furnished crib of the best hay, and a manger either of bran, or corn ground, or some other nourishing food. Chelsea Hospital is not better accommodated.—PRATT'S *Gleanings*.

The following fine panegyric on the horse is taken from a beautiful neglected poem of the immortal Shakspeare:

Imperiously he leaps, he neighs, he bounds,
And now his woven girts he breaks asunder;
The bearing earth with his hard hoof he wounds,
Whose hollow womb resounds like heaven's thunder:
The iron bit he crushes 'tween his teeth,
Controlling what he was controlled with.

His ears up-pricked, his braided hanging mane,
Upon his compassed crest now stands on end,
His nostrils drink the air, and forth again,
As from a furnace, vapours doth he lend:
His eye, which glistens scornfully like fire,
Shows his hot courage, and his high desire

Sometimes he trots, as if he told the steps,
With gentle majesty and modest pride:
Anon he rears upright, curvets, and leaps,
As who should say, Lo! thus my strength is tried:
And thus I do to captivate the eye
Of the fair breeder that is standing by

What recketh he his rider's angry stir,
His flattering holla, or his stand, I say?
What cares he now for curb, or pricking spur?
For rich caparisons, or trappings gay?
He sees his love, and nothing else he sees,
For nothing else with his proud sight agrees.

THE ELEPHANT.

Peaceful beneath primeval trees that cast
Their ample shade o'er Niger's yellow stream,
And where the Ganges rolls his sacred wave,
Or mid the central depth of blackening woods,
High rais'd in solemn theatre around,
Leans the huge elephant.

THE elephant, the largest of all quadrupeds, and an animal which, in many respects, merits our attention, is a native of India. When at full growth, it measures from seventeen to twenty feet in height from the ground to the highest part of the back, which is six or seven feet broad, and somewhat protuberant. The elephant has a round thick body, a large short head, and a short neck; a long proboscis, snout, or trunk, hanging down almost to the ground; a little narrow mouth, with two long tusks proceeding from the upper jaw, one on each side of the proboscis; besides four strong grinders in each jaw; small piercing eyes, and large flat ears. Its legs are round and thick, supporting its vast weight like so many columns; and its feet are short, those before being broader and rounder than those behind, each of them defended by four hoofs. Its skin is very hard, especially on the breast; its colour is generally dusky or black; but there is a white species, not so common as the others.

The proboscis, or trunk, of the elephant is of such a structure, that he can extend or contract, dilate, raise or depress, and bend or twist it about at pleasure. Sometimes he makes it of a concave, sometimes of a convex form; now doubles it, again expands it, and, in short, turns it round every way with surprising agility. By this member he takes in his meat and drink, and conveys them to his mouth; by this he takes up a vast weight, levels trees, and makes use of it as a hand upon all occasions; and it likewise serves for the purposes of smelling and respiration.

It is really wonderful to observe how nimbly the elephant moves his trunk, considering its bulk, being six o

seven feet long, and three feet or more in circumference at its origin, but growing smaller from thence to its extremity. The shortness of the elephant's neck is compensated by the length of this member, which Dr. Derham says is so admirably contrived, so curiously wrought, and applied with so much agility and readiness by that unwieldy creature to its several occasions, that he thinks it a manifest instance of the Creator's wisdom.

History affords us several instances of the love, fidelity, and gratitude, of the elephant, which are very surprising. Ælian relates that when Porus, King of India, was subdued by Alexander the Great, he was wounded with several darts, which the elephant he rode upon pulled out of his body with his proboscis; and when he perceived his master fainting by the loss of blood, gradually leaned himself down till he fell flat upon the ground, that his master might receive no harm by alighting. Athenæus mentions the gratitude of an elephant to a woman that had done him some service, and used to lay her child near him when it was very young; for, the mother dying, the elephant was so fond of the child, that he showed great uneasiness when it was taken out of his sight, and would not eat his food unless the nurse laid the child in the cradle between his feet, but then he would eat heartily. When the child slept, he chased away the flies with his proboscis; and when it cried, he would toss or rock the cradle till it fell asleep.

An elephant in Adsmeer, which often passed through the market, as he went by a certain herb-woman, always received from her a mouthful of greens: at length he was seized with a periodical fit of rage, broke his fetters, and, running through the market, put the crowd to flight, and among others this woman, who, in her haste, forgot a little child she had with her. The animal, recollecting the spot where his benefactress usually sat, took up the infant gently in his trunk, and placed it in safety on a stall before a neighbouring house.

Another elephant, in his periodical madness, killed his keeper; upon which the wife took her two children, and flung them before the elephant, saying, "Now you have destroyed the father, you may as well put an end to their lives and mine." The creature instantly relented, placed

the largest of the children on his back, adopted him for his keeper, and would never afterwards be mounted by any other person.

It also appears, from respectable authority, that a soldier at Pondicherry, who was accustomed to give part of his victuals to one of these animals, having one day drank too freely, and, finding himself pursued by the guards, took refuge under the elephant's body, and fell asleep. In vain did the guard endeavour to force him from this asylum, for the elephant resolutely protected him. Next morning, the soldier, recovering from his intoxication, shuddered with horror to find himself under the belly of this huge animal; but the elephant immediately began caressing him with his trunk, to make him understand that he might now depart in safety.

But as elephants are remarkable for their love and gratitude, so they are subject to resentment.—Acosta asserts, that a soldier in Cochin, a town on the coast of Malabar, having thrown a nut at an elephant, the beast took it up and hid it; and, some days after, seeing the soldier pass by, threw the nut in his face, making a great noise, and going away leaping and dancing. Another soldier, in the same town, meeting an elephant, with his keeper, would not give way to them; whereupon the keeper complained of the affront to the elephant, who, some time afterwards, spying the soldier by the side of the river that runs through the town, ran hastily towards him, lifted him up with his trunk, and plunged him several times in the river; after which he drew him out, leaving him to be laughed at by the spectators.

Captain Hamilton observes, that, when he was at Achen, in the island of Sumatra, he saw an elephant that had been kept there above a hundred years, but, by report, was then three hundred years old; he was about eleven feet high, and was remarkable for his extraordinary sagacity, of which he gives an instance in a laughable piece of revenge he took on a tailor. In 1692, says he, a ship, named the Dorothy, commanded by Captain Thwaits, called at Achen for refreshments; and two English gentlemen in that city went on board to furnish themselves with such European necessaries as they had occasion for, and, amongst other things, bought some Norwich stuffs for

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clothes; and, there being no English tailor to be had, they employed a sural, who kept a shop in the great market-place, and had commonly several workmen sewing in his shop. It was the elephant's custom to reach in his trunk at the doors or windows as he passed along the side of the street, as begging for the decayed fruits and roots, which the inhabitants generally gave him. One morning, as he was going to the river to be washed, with his rider on his back, he happened to put his trunk in at this tailor's window; and the tailor, instead of giving him what he wanted, pricked him with his needle. The elephant seemed to take no notice of the affront, but went calmly on to the river, and washed; after which he troubled the water with one of his fore feet, and then sucked up a great quantity of the dirty water into his trunk, and, passing unconcernedly along the same side of the street where the tailor's shop was, he put in his trunk at the window, and spirted out the water on the tailor with such a prodigious force, that the offender and his journeymen were blown off their board, almost frightened out of their senses.

A painter was desirous of drawing the elephant which was kept in the menagerie at Versailles, in an uncommon attitude, which was that of holding his trunk raised up in the air, with his mouth open. The painter's boy, in order to keep the animal in this posture, threw fruit into his mouth, but as he frequently deceived him, and made an offer only of throwing the fruit, the elephant grew angry; and (as if conscious that the painter's intention of drawing him had occasioned the insult) he turned his resentment upon the master, and taking a quantity of water in his trunk, spouted it over the drawing, and completely spoiled it.—SMITH'S *Wonders.*

ORANG OUTANG.

THE chief of the monkey tribe, or Orang Outang, has been often studiously held up as not only making a nearer approach to the general figure of mankind than any other animal, but even as possessing a degree of intellect superior to the rest of the animal world; and a variety of

exaggerated descriptions might be cited from those who have given its natural history. Two very distinct species of Orang Outang are known; the one a native of Africa, and of a black colour; the other a native of the East Indies, and of a reddish or chestnut colour. It is to these that most of the popular tales relate. But the two species, distinct as they are, have been till lately confounded by most authors, and among others by Linnæus, under the title of Simia Satyrus. The species which makes the nearest approach to the human figure, is the chestnut-coloured, or reddish Orang Outang, well represented in the works of Vosmaer and Audebert.

Mr. Vosmaer's account of the manners of a chestnut-coloured Orang Outang, brought into Holland, in the year 1776, and presented to the Prince of Orange's menagerie, is so curious, that I shall repeat it from his accurate publication on that subject.

This animal, says Mr. Vosmaer, was in height about two Rhenish feet and a half. It shewed no fierceness or malignity, and was even of a melancholy appearance. It was fond of being in company, and shewed a preference to those who daily took care of it, of which it seemed to be very sensible. Often when they retired, it would throw itself on the ground as if in despair, uttering lamentable cries. Its keeper having been accustomed sometimes to sit near it on the ground, it would take the hay of its bed, and spread it in the form of a cushion, or a seat, and by every demonstration invite its keeper to sit with it. Its usual manner of walking was on all fours, but it could also walk on its two hind feet. One morning it got unchained, and we beheld it, with wonderful agility, ascend the beams and rafters of the building; it was not without some trouble that it was taken, and we then remarked the prodigious strength of the animal, the assistance of four men being necessary, in order to hold it in such a manner as to be properly secured. During its state of liberty, it had, among many other things, taken the cork from a bottle of Malaga wine, which it drank to the last drop, and had set the bottle in its place again. When presented with strawberries on a plate, of which it was extremely fond, it was very amusing to see it take them up one by one with a fork, and put them into its mouth. Its common drink was

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water, but it also willingly drank all sorts of wine, but preferred Malaga. After eating, it always wiped its mouth, and when presented with a toothpick, always used it in a proper manner. This animal lived seven months in Holland, and was brought from the island of Borneo.—Dr. Shaw's *Zoological Lectures.*

THE LION.

Of all the animals of Barbary, the Lion, usually called the king of beasts, seems to merit our first attention. This fierce animal, which rules with such a tyrannical empire over the inhabitants of the woods and deserts, has a head very large, and not at all proportioned to his body. He has a thick flattish nose, a very wide mouth, red fiery eyes, hollow, and looking somewhat awry. His neck is adorned with a fine shagged mane, but the lioness wants this ornament. He has a long tail, very strong legs, and each of his fore feet has five distinct claws, except the hinder, which has but four, all crooked, sharp, and exceeding hard. The hair of some lions is curled, of others lank and thin, and generally of a dun colour; but Mr. Park informs us that he once saw a very large red lion in the course of his travels through the interior of Africa. The roaring of the lion is frightful, and every beast dreads his approach. He is of a very savage nature, preying upon other animals, chiefly the wild boar, which yet (as Dr. Shaw informs us) has sometimes been known to defend itself with so much bravery, that the victory has inclined to neither side, the carcases of them both having been found lying dead together, covered with gore and mangled to pieces.

Some have reported that the lion is afraid of women, and that, upon taking up a stick and calling him names, he will immediately lose his fierceness, and fly from the flocks they are attending. Something of this kind, says a learned traveller, perhaps may have happened when they have been well satiated with food, at which time the Arabs pretend the lions have so little courage, that they can seize upon their prey, and rescue it out of their jaws. But these instances are very rare, it oftener falling out, that lions de-

vour women as well as men, for want of other creatures. Fire is what they are most afraid of; and yet notwithstanding all the precaution the Arabs take in this respect, together with the barking of their dogs, and the noise themselves make all night long, it frequently happens, that a lion will leap into the midst of an enclosure, and bring out along with him a sheep or a goat. If these ravages are repeated, the Arabs take notice where the lion enters, and there dig a pit, covering it over slightly with reeds, or small branches of trees, into which he falls and is taken.

The hunting of the lion, according to Dr. Shaw, is in some respects like the method of taking elephants heretofore described. On this occasion a whole district is summoned to appear, who, forming themselves into a circle, enclose a space three, four, or five miles in compass, according to the number of people and quality of the ground that is pitched upon to be the scene of action. The footmen advance first, rushing into the thickets with their dogs and spears to put up the game; whilst the horsemen, keeping a little behind, are always ready to charge, as soon as the wild beast makes a sally. Thus they proceed, still contracting their circle, till they all at last either close in together, or meet with something to divert them. This sort of pastime is sometimes very agreeable; for different kinds of animals being by this means driven together, they seldom fail of having chases after hares, jackalls, hyenas, and other creatures, as well as the lion. But this sport is frequently attended with fatal accidents; for it is a common observation, that when the lion perceives himself in danger, nay sometimes the very moment he is roused, he will seize directly upon the person that is nearest to him, and, rather than quit his hold, suffer himself to be cut to pieces.

Lions are very common at the Cape, where they are extremely large, and every limb is expressive of the greatest strength; the firmness of their tread, their dreadful paws, and sparkling eyes, command attention, and show their strength superior to that of other animals. Some authors have affirmed that the bones of the lion are not so hard as they have been represented by the ancients; but Mr. Kolben observes, that the hollow which runs through the shinbone of a lion, is as small as that which runs through a

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tobacco-pipe; and when it is broken to pieces, and the oiliness exhausted by the heat of the sun, these pieces appear as hard, smooth, and solid as flints; and serve altogether as well to strike fire with. Indeed, a considerable part of this animal's strength lies in the hardness of his bones; for when he comes upon his prey, he knocks it down dead, and never bites till he has given the mortal blow, which he generally accompanies with a terrible roar. When enraged, or pinched with hunger, he erects and shakes his mane, lashing his back and sides with his tail. When thus employed, it is certain death to come in his way; and as he generally lurks for his prey behind bushes, travellers are sometimes devoured by him; but if he neither shakes his mane, nor makes any great motion with his tail, a traveller may be fully assured of passing by him in safety. A horse no sooner discovers a lion than he runs full speed; and, if he has a rider, throws him, if possible, in order to run the faster. When a traveller on horseback discovers a lion, the best method of preservation is instantly to dismount, and abandon his horse, which the lion will pursue, without taking notice of him. The flesh of the lion is said to taste something like venison.—SMITH's *Wonders.*

THE DOG.

AMONG the various animals which have been rendered subservient to the human race, the dog ranks high in utility and importance. Recurring to the earliest stages of society, we find that, by means of its fleetness, courage, and sagacity, creatures the most ferocious are subdued or obtained for domestication, that it has ever contributed to procure subsistence for man, to watch his personal safety, and to protect his property. If we are not now equally sensible of the advantages resulting from its aid, it is because other substitutes have rendered it less essential.

In a general view of the nature and disposition of the dog, we find it materially affected by the habits of that portion of mankind among whom it dwells. It undergoes a sensible modification. Vicious and ferocious among savage tribes; gentle and docile with those that are hu-

manized. No animal is of equal docility with the dog. By a kind of intuitive faculty he soon learns to distinguish the friends of his master's family, while his own attachment to him remains unimpaired; they are courteously welcomed to his dwelling, but strangers are angrily repulsed. The animals around him are treated as his master would treat them. A natural enemy to wild beasts, the kitten, the fawn, and the leveret domesticated along with him, become objects of regard. He is tractable and complying, submits in patience to his master's resentment, and forgets all his pains in the joy of being restored to a place in his favour. It is from this docility and fidelity of the dog, that mankind have derived the principal services which are now exacted from him; that he has pursued the beasts of the forest, in concert with the rudest of our ancestors, or has watched the drawing of the net, or the deadly aim of the more civilized sportsman. Nor is it in aiding the acquisition of subsistence only, that his use is most conspicuous; he boldly stands forward the first to defend it, and is the faithful guardian of the night, whose vigilance never sleeps.—BREWSTER'S *Edinburgh Encyclopedia.*

When I see (says Dr. Parsons), and contemplate upon the several actions and designs of my little dog, who gives me much pleasure every day, I profess it is impossible to avoid being amazed. His passions are more quick than those of many men I have taken notice of. There are some whose joy and grief at accidents give them so little emotion, and who are so dull, as to render it difficult to say which it is that affects them; but, in this honest animal, both are lively and strong. When any of my family return home, he shews great gladness in his caressing and skipping about them, and seems dull and concerned at their going out; but there is one among them whom he distinguishes in a most particular manner. When this person goes abroad, he is void of all comfort, and sits in a window, crying incessantly, refusing victuals, and watching for his friend's return, who is always welcomed by much rejoicing and noise. If he wants to go out of the room, he puts his fore feet up against one of the company, and, being taken notice of, runs to the door, rising up against it in the same manner, looking at the person

ESQUIMAUX SLEDGES.

he gave notice to before, till he is let out; if he wants to drink, he gives the same notice, and immediately runs into a closet, where stands a bottle of water, continuing to run to and from the person till he is served. Is not this cogitation and sense?—Dr. Parson's *Philosophical Observations.*

The Greenlanders use these creatures to draw their sledges in the manner represented in the plate, yoking four, six, and sometimes eight, to a sledge, loaded with five or six large seals; and it is said, that they often travel sixty miles in a winter's day upon the ice.

In the north of Tartary, while the snow is upon the ground, the inhabitants travel in sledges drawn by dogs, which are esteemed swifter and longer lived than any other dogs; and this may be attributed to their light simple food, which is fish. In the spring, every one sets these animals at liberty, without taking any care about them: then they feed on what they can get in the fields, where they dig for the mice; and in the rivers they catch fish. In the month of October, they are called home by their respective masters, who tie them up near their huts, till they lose a great deal of their fat, that they may be lighter for the roads. These dogs also give certain signs of an approaching storm; for when they stop, if they scrape the snow with their feet, it is advisable, without loss of time, to look out for some village, or other place of safety. And it is said, the dogs here serve instead of sheep, because their skins are used for clothes. Those which are bred up to hunt deer, wild rams, sables, foxes, *&c.*, are sometimes fed with jackdaws, which, it is observed, make their scent the stronger for finding out birds and wild beasts.—Smith's *Wonders.*

To recount the *numberless* instances of sincere attachment in this faithful animal, volumes would be insufficient to contain the record; we therefore shall conclude this brief panegyric, with the following account of a canine chief mourner at a funeral.

The late Mr. Langford of Bolsover, Derbyshire, amongst other eccentric provisions in his will, left three shillings per week for the maintenance of a favourite little dog with an express desire, that on the day of his interment it

might be clothed with a sable mantle, and attend his remains as one of the *chief mourners*, which was accordingly done with the greatest pomp and solemnity.

THE MARMOT.

The marmot is a kind of rat, inhabiting the highest summits of the Alps, and other mountains of Italy, and feeding on the grass and wild herbs they afford. This animal is about sixteen inches in length, and bears some resemblance both to the rat and the bear; having a large flattish head, short ears, and a thick bushy tail. The colour is brownish above, and bright tawny on the under parts. About the end of September, they retire into their holes, which are formed with astonishing art and precaution. They do not make a single hole or straight tube, but a kind of gallery in the form of a *Y*, each branch having an aperture, and both terminating in a capacious apartment. One of the branches which rises above the principal apartment is merely used as an entrance; but the other is a kind of aqueduct, which carries off all impurities.

Against the approach of winter, these singular animals lay up great store of moss and hay. It is affirmed, that this labour is carried on jointly; that some cut the finest herbage, which is collected by others. Whilst they are thus employed, one stands sentinel, and, upon the first appearance of danger, gives a loud whistle, which warns his companions to provide for safety by a precipitate retreat.

When they feel the first approaches of the sleeping season, they close up both the passages to their habitation with such solidity, that it is easier to dig the earth any where else than in the parts they have thus fortified. At this time they are extremely fat; but they gradually decline, and at the end of winter are much emaciated. When discovered in their winter retreats, they appear rolled up in the form of a ball, and are so completely torpid, that they may be killed without seeming to feel the least sensation of pain.

The marmot is naturally inoffensive: but when they are beset by enemies, and flight appears impracticable, they defend themselves with astonishing spirit and fury In their wild state, the old marmots, at break of day

come out of their holes to feed, while the young one, chase each other over the rocks, sit on their hind legs, facing towards the sun, with an air expressive of satisfaction. They are particularly fond of warmth, and will bask in the sun for several hours. When taken young they are easily domesticated; and may be taught to walk on the hind feet, sit upright, dance, and perform various other tricks. It has a strong antipathy to dogs, and will resist the most formidable animal of that species. During winter, the marmots are taken in great numbers by the Italian peasantry, who reckon their flesh very delicate, and their fat medicinal.—SMITH's *Wonders*.

THE CAMELOPARD, OR GIRAFFE.

THE animal of this species, which in September, 1827, was landed at Waterloo-bridge, was sent from Egypt as a present to his majesty.

Measured from the fore-hoofs to the tip of the ears, its height is between ten and eleven feet; its colour a light fawn, the spots of the same hue, but darker. The eyes are large, dark, and expressive; and both they and the ears move very quickly. It has two short tufts between the ears, which are covered with long hairs, falling over the top, towards the back of the neck. The joints of the fore-legs are very large, like a young calf's; the legs, viewed in front, are not perpendicular, but diverge from the body, and spread out as if intended by providence to poise his immense height when standing.

With its keepers it displays great confidence, but with strangers it is shy and timid. In its native country it browses on the tops of trees, preferring those of the mimosa species, which are there plentiful.

The giraffe can only amble; but the length of its limbs renders its progress very rapid, notwithstanding their too great approach to one another, and the slight inequality of the fore and hind members. When pursued, it flies with great speed; but the narrowness of its lungs will will not allow it to support a long race.

The giraffe serves for food to the inhabitants of the central parts of Africa, and its flesh is said to be very succulent. It is found only in the centre of Africa, and at some hundreds of leagues either from Egypt, or from the Cape.

THE ZEBRA.

THE zebras of the Cape are very beautiful creatures, and are improperly called wild asses, for they are of the size of an ordinary saddle-horse, and resemble an ass in nothing but the length of their ears. The legs of this fine and well-proportioned animal are slender, and the hair on his body soft and sleek. On the ridge of his back a black streak extends from his mane to his tail, and on each side are a great many streaks of various colours, that meet under his belly in so many circles; some are white, some yellow, and some of a chestnut-colour; and these colours lose themselves in one another, in a very beautiful manner. His head, ears, mane, and tail, are also streaked with the same variety. He is so swift, that it is said, there is not a horse in the world that can keep up with him.

Attempts have been made to domesticate the zebra, and to reduce it to obedience like the horse, but as yet the success has not been very considerable. Experiments of this kind have been chiefly made in Holland; and we are told by the Count de Buffon, that zebras have been yoked to the stadtholder's chariot; this, however, proved to be a piece of misinformation, and is accordingly contradicted in the sixth supplemental volume.

REMARKABLE BIRDS.

SOLAN GOOSE.

SEVERAL of the western isles of Scotland are frequented by vast numbers of Solan geese, particularly St. Kilda, Soa, and Borera. The inhabitants of these little islands (the two last of which are not above a mile in circumference) annually take about twenty thousand of these birds, which they keep in storehouses built for that purpose. These wild geese will fly above thirty leagues to fish for herrings, and return to their nests with five or six entire in their gorges, which they cast up to feed their young.

Their fat is accounted a good vulnerary, and the St. Kildians eat their eggs with a keen appetite, even after they have lain till they smell most offensively.

The nest of the Solan goose is a large collection made up of very different materials; she carries any thing that is fit for her purpose, whether on land, or floating on the waters, to the place where she builds; grass, sea-weeds, shavings of timber, pieces of cloth, *&c.*; yet such is the difficulty in furnishing a sufficient quantity of these different materials for building, that they often encroach on their neighbour's property; and the manner in which they do it, shows that want has given them notions of property unknown among fowls which have plenty: thus if a Solan goose finds her neighbour's nest at any time vacant, she takes advantage of the circumstance, steals as much of the materials as she can conveniently carry, and, sensible of the injustice she has done, flies directly towards the ocean; when, if the lawful owner does not discover the injury before the thief is out of sight, she escapes with impunity, and soon returns with her burden, as if she had made a foreign purchase.

It has been said, that one of the body acts the part of a sentinel, while the other geese are asleep, and gives the alarm if an enemy should approach; and that a general massacre might be easily made, if this sentinel were surprised and despatched. But the St. Kildians deny, that the safety of the whole flock depends so entirely on the vigilance of the watch. The Solan geese repair to St. Kilda in the month of March, and continue there till after the beginning of November, when they migrate to some other favourite regions.—Smith's *Wonders.*

SUPERB WARBLER OF NEW SOUTH WALES.

The superb warbler is a very beautiful bird, about five inches and a half in length. The feathers of the head are long, and stand erect like a full crest: from the forehead to the crown they are of a bright blue, and from thence to the nape they are black like velvet. Beneath the eyes, and on the chin, the feathers are of a deep blue, and across the back part of the head there is a band of

the same; the whole giving the head a greater appearance of bulk than is natural. The hind part of the neck and upper parts of the body are deep blue and black; the under, pure white; the wings dusky. The tail is about two inches and a quarter long and cuneiform, the two outer feathers being very short. The legs, feet, and claws, are black, and extremely slender.

According to the best and most recent accounts, the female is entirely destitute of all the fine blue colours by which the male is adorned; except that there is a narrow rim of azure round each eye, apparently on the skin only: all the upper feathers consist of shades of brown, and the whole throat and belly are pure white; so that the epithet *superb* seems to apply very ill to the female of this species.

THE FISHING-BIRD OF CHINA.

The louwa or fishing-bird of China is about as large as our herons, with webbed feet, and a long crooked bill. It is said, that the Chinese fishermen train up these fowls to catch fish, and bring them to be as tractable and as much under command, as hawks or spaniels are to the sportsmen in England. When they go to fish with them, either in the sea or the rivers, they have them perched on the sides of the boat, waiting for the word of command; which when the fishermen give, they take flight, and separately look for their prey; and, when one of them has seized a fish, (for which they frequently dive) he brings it to his master in the boat, and then flies away again upon the same errand. As fish is the natural food of these birds, they need no teaching to catch them; but the difficulty lies in restraining them from devouring their prey; and to train them so as to bring it to their masters. To this end they tie a string about their necks, so slack as to suffer them to breathe, but so tight as to prevent their swallowing a fish, unless it be very small; and, when they have taken fish enough to satisfy their master, he takes off the string, and lets them work for themselves.—Smith's *Wonders.*

THE PREACHER.

One of the most extraordinary birds of South America, however, seems to be the tulcan or preacher, which is of the size of a pigeon, but has much longer legs; its tail is short, and its plumage dark, spotted with blue, purple, yellow, and other colours, that have a very beautiful effect. Its head greatly exceeds all proportion, with respect to its body; but this is necessary to enable it to support its bill, which is no less than six or eight inches from the root to the point: the lower mandible closes with the upper through the whole length, and both diminish insensibly to the end, when it suddenly bends and terminates in a strong, sharp point. The tongue is formed like a feather, and, as well as the inside of its mouth, is of a deep red. The bill is variegated with all the bright colours that adorn the plumage of other birds: at the base, and also at the convexity, it is generally of a light yellow, forming a kind of riband, half an inch broad; and the rest is of a fine deep purple, except two streaks near the root, of a rich scarlet. The name of preacher, has been given to this bird, from its being accustomed to perch on the top of a tree, above the other birds, while they are asleep, and making a noise, like ill-articulated sounds, moving his head to the right and left, in order to keep off the birds of prey from seizing the others. They are easily rendered so tame, as to run about the house, and come when called. Their usual food is fruit; but the tame eat other things, and, in general, whatever is given them.

THE MOCKING-BIRD.

The next curiosity among the feathered inhabitants of North America, is the mocking-bird, so called from its imitating the notes of all other birds, which, with the many charming ones of its own, makes it accounted the finest singing bird in the world. There are two sorts of them, the grey and the red, both about the size of a thrush; but the former is most esteemed, as having the softer note. Its feathers are much of the colour of our grey plovers, with white in the wings like a magpie; and its

postures in flying are very odd, sometimes with its tail upright and its head down, and sometimes the contrary. It is a brisk, bold bird, and yet seems to be of a tender constitution, neither singing in winter, nor in the middle of summer, and with much difficulty are any of them brought to live in England. It sings not only by day, but also at all hours of the night on the tops of chimneys.—SMITH's *Wonders.*

REMARKABLE FISHES.

THE NAUTILUS, OR SAILOR.

OF all the shell-fish which either our own or any other seas afford, perhaps none are more to be admired than the nautilus or sailor, which Vallisneri has prettily described, and after him the ingenious author of *Spectacle de la Nature.* The turbinated shell of this fish, which is beautified with strong and lively colours, may properly be called a natural boat, since the little animal that inhabits it makes use of it in that capacity. In calm weather he mounts up in it to the surface of the water, unfurls a membrane to the wind, which serves him instead of a sail, and extends two arms, with which, like oars, he rows his little bark along. When he has a mind to dive, he strikes sail, collects himself within his shell, and, filling the remaining cavity with water, sinks to the bottom; for the fish, by contracting himself, leaves a vacant space in his boat, into which the water finds admittance through a little aperture, and by its additional gravity causes it to subside. On the other hand, when the fish has an inclination to ascend to the top, it is probable he dilates himself, and so forces the water out of his boat, by which evacuation it becomes specifically lighter than the water, and consequently rises to the surface. Thus the animal steers his course without chart or compass, self-taught in the art of navigation, and is at once both vessel and pilot. From whatever quarter the wind blows it is all one to our little sailor, who is under no apprehension of

danger, nor ever destitute of rudder or oars, pump, or cordage, having within himself all the necessary utensils of navigation.

THE HERMIT-CRAB.

The soldier-crab, or hermit, is a very remarkable kind of shell-fish, described by Rondeletius and other naturalists, as living in a house not its own, and owing its security to the labour of another, though nature has provided it with a shell, and given it claws to defend and subsist itself. It is the custom, it seems, of this fish to take possession of the first shell he finds empty, and sometimes several of them meet naked, and contend for the same habitation, in which case, he that has the strongest pincers carries the day. Here the conqueror takes up his lodging for some time, till, being grown too big for his house, he quits it, and seeks out for another of a convenient size, where he stays till he is tired of it, or is grown too bulky, and then he removes again. This is the account that naturalists give of this fish; but the French author lately mentioned does not think it deserves the character of a lazy animal that lives by the labour of others, as it is usually represented; for nature (says he) knows no such principle as idleness, nor ever acts without reason or wise design. The truth is, the body of this fish, called by the French the poor man or the hermit, is flabby, and covered with a thin shell insufficient for its security; which obliges it to take shelter in some of those empty shells, which are of no use but to such a tenant. This precaution of the hermit, is not unlike that of the little crab, which, being sensible of the weakness of his own shell, begs house-room of the muscle, who, having some to spare, receives his guest, and they live very neighbourly together.

THE SEA-DEVIL.

Among the fish found on the gold coast are the sea devil and the horned fish; the former is about twenty-five feet long, and proportionably thick; but it is most

remarkable for the angles which project from its body, and are of a hard horny substance. The head, which is large, is joined immediately to the body, without the smallest appearance of a neck, and is furnished with flat teeth. Nature has bestowed on this animal four eyes, two of which are near the gills, and are large and round, but the two others on the forehead are of a smaller size. On each side the gullet are three horns, of an equal length and thickness; that on the right side, which stands between the other two, is about three feet in length, and an inch and a half in circumference, at its insertion, gradually terminating in a sharp point; but, as it is yielding and flexible, it affords the animal only a feeble protection. The tail, which is long and taper, like a whip, is armed with a sharp point, which he frequently darts backward, and his back is covered with hard excrescences, two inches high. The flesh is tough and ill tasted, though much sought after by the negroes.—SMITH'S *Wonders.*

PILOT FISH.

To this we may add the pilot fish, which is seldom above a foot or eighteen inches long, but is extremely beautiful, being streaked transversely, with blue and a yellowish brown that have a very pleasing effect on the water, but lose much of their lively gloss when taken out of it. These fish, says Mr. Grose, are often seen in small shoals, swimming immediately a-head of the shark, or near him. When a bait is thrown out for the shark, they cluster about it, without attempting to nibble it; but, by their motions to and fro, seem to guide the shark towards it,—from whence they obtain the name of pilot fish. When in company with the shark, they seldom take the small hook; but, when they have lost this companion, or follow a ship, either singly or in shoals, they sometimes bite, and are caught. They are esteemed, for their size, the most delicious eating the ocean affords, and have nothing of that dryness attributed to many other sorts of fish.

FORMATION OF THE MUSCLE-SHELL HINGE.

THERE is a surprising deal of workmanship shown in the formation of that hinge which joins the upper and lower shells of a muscle, and in the curious movements of those little muscular fibres and ligaments with which it is fastened. When the animal has a mind to shut itself close up within its vaulted habitation, it discharges a certain liquor into those muscles, which causes them to dilate and swell, and consequently shortens their length, so that both the shells are thereby brought closer together. On the other hand, when it is disposed to open its doors, at the return of a new tide, or the fall of some agreeable shower, it withdraws that liquor from them, whereby they are relaxed and lengthened. But these, our author acknowledges, are only probable conjectures, it being impossible for us to determine any thing certain of what is concealed from our observation at the bottom of the sea. However, what we do see is sufficient to excite wonder and astonishment, at the constant regularity of nature in providing for the meanest creatures, and our gratitude to the Great Author of Nature for those innumerable benefits he so liberally bestows upon us.—SMITH'S *Wonders.*

REMARKABLE INSECTS.

THE BEE.

Induced by such examples, some have taught
That bees have portions of ethereal thought;
Endued with particles of heavenly fires.—DRYDEN.

THESE curious insects, so remarkable for their sagacity and economy, and whose labours are so advantageous to mankind, were imagined by the ancients to be first bred on Mount Hymettus, in Greece, which was always famous for its excellent honey, and that the swarms dispersed over the world were only colonies from that mountain.

With respect to their form, the bee is divided the ligaments into three parts,—the head, the breast, the belly. The head is armed with two jaws and a trunk; the former of which play like two saws, opening and shutting to the right and left. The trunk is long and taper, and extremely pliant and flexible, being destined by nature for the insect to probe to the bottom of flowers, through all the impediments of their chives and foliage, and drain them of their treasured sweets. But were this trunk to be always extended, it would prove incommodious, and be liable to be injured by a thousand accidents; it is, therefore, of such a structure, that, after the performance of its necessary functions, it may be contracted or folded up; and, besides this, it is fortified against all injuries by four strong scales, two of which closely sheath it, and the two others, whose cavities and dimensions are larger, encompass the whole.

From the middle part, or breast, of the bee grow the legs, which are six in number; and at the extremity of the paws are two little hooks, discernible by the microcopes, which appear like sickles, with their points opposite to each other. The wings are four, two greater and two smaller, which not only serve to transport them through the air, but, by the noise they make, to give notice of their departure and arrival, and to animate them mutually to their several labours. The hairs, with which the whole body is covered, are of singular use in retaining the small dust that falls from the chives of the flowers. The belly of the bee consists of six rings, which slide over one another, and may, therefore, be lengthened or contracted at pleasure; and the inside of this part of the body contains the intestines, the bag of honey, the bag of poison, and the sting. The office of the intestines is the same as in other animals. The bag of honey is transparent as crystal, containing the sweet juices extracted from flowers, which the bee discharges into the cells of the magazine for the support of the community in winter. The bag of poison hangs at the root of the sting, through the cavity of which, as through a pipe, the bee ejects some drops of this venomous liquor into the wound, and so renders the pain more excessive.

The mechanism of the sting is admirable, being com-

posed of two darts, enclosed within a sheath that tapers into a fine point, near which is an opening to let out the poison. The two darts are ejected through another aperture, which, being armed with several sharp beards like those of fish-hooks, are not easily drawn back again by the bee; and, indeed, she never disengages them, if the wounded party happens to start, and put her into confusion; but if one can have patience to continue calm and unmoved, she clinches those lateral points round the shaft of the dart, by which means she recovers her weapon, and gives less pain to the person stung. The liquor, which at the same time she infuses into the wound, causes a fermentation, attended with a swelling, which continues several days; but that may be prevented by immediately pulling out the sting, and enlarging the puncture, to let the venomous matter have room to escape.

We must now consider the generation, polity, and labours of these insects, the true knowledge of which has resulted, in a great measure, from the modern invention of glass hives, through which all the secrets of the community are laid open to a curious observer. Any person, who carefully examines a hive at different seasons of the year, will distinguish three sorts of bees, of which the greater number are the common working bees, who do all the business of the hive, and seem to be neither male nor female. The second sort, called drones, are the males, which are somewhat larger, have no sting, nor ever stir from the hive, but live upon the honey prepared by the others. The third sort is a much larger and longer-bodied bee, of which there is often but one in a hive,—at least, but one in every swarm, or colony, of young bees, who are from time to time detached from the hive in search of another habitation. This large bee is what the ancients called the king, from the respect they always saw paid to it by the other bees; but, being a female, the moderns more properly give it the title of queen, or mother of the swarm.

Mr. Reaumur, desiring to try how far the accounts given of the homage paid by the others to the queen bee was true, caused a swarm of bees to be swept down into a glass hive Among these there was one female, which

was soon distinguished by her shape, and the shortness of her wings. For some time she walked alone at the bottom of the hive; the rest seeming to regard nothing but their own safety. The female, after going twice or thrice up the sides of the hive, to the top of it, where they were hung, at last went in among the cluster, and brought down about a dozen with her. Attended with these, she walked along slowly at the bottom of the hive. But the rest continuing at the top, she went again and again, till they all came down, and formed a circle about her, leaving her a free passage wherever she turned to walk, and feeding her with the honey they had gathered for themselves.

While the hive is sufficient to contain the bees without inconvenience, the society live peaceably together; but when their numbers are multiplied so that their habitation is too small, the young brood quit the place of their nativity, and fly in quest of a new settlement. The swarm that goes out consists of the common bees, under the conduct of one female or queen; or if two queens come out of the same hive, then the body of common bees divides into two parts, each following one female; both parties, however, when they alight out of the air, usually settle near each other on a branch of a tree; and then those bees which form the smallest swarm go off, one by one, to the other cluster, deserting the queen they followed, who is at length murdered by her subjects. The swarm being thus united and hanging down from the tree, the countrymen, who are always vigilant on these occasions, provide for their accommodation a hive rubbed with balm, thyme, and other odoriferous herbs, into which they gently brush them from the branch, and carry them to a stand prepared for that purpose. All this the bees bear very patiently, and after they are a little composed, they begin to think of forming themselves convenient apartments in their new habitation.

When they set about this work, it is observed that they divide themselves into four bands, one of which flies into the fields to provide materials for the structure; the second works upon these materials, and forms them into a rough sketch of the dimensions and partitions of the cells; the third band examines and adjusts the angles, removes the

superfluous wax, polishes the work, and gives it its necessary perfection; and the fourth is employed in bringing provisions to the labourers. M. Maraldi takes notice, that the bees employed in polishing the combs, work longer than those that build them, because polishing is not so laborious. They begin their work at the top of the hive, continuing it downwards to the bottom, and from one side to another; and to make it the more solid, they use a sort of tempered wax, which is pretty much like glue.

The form of the cells of the honey-comb is hexagonal, which figure, besides what is common with a square and equilateral triangle, has the advantage of including a greater space within the same surface. The best mathematician, indeed, could not have chosen a more proper figure than the bees do for such a combination of apartments; for although circular cells would have been the most capacious, this would by no means have been a convenient figure, because much of the room would have been taken up by the vacancies between the circles. It was therefore necessary to make use of some of the rectilinear figures, amongst which the only proper ones were the triangle, the square, and the hexagon; and the bees wisely chose that figure which consisted of most angles, as supposing it the most capacious.

The expedition of the bees in their labour is almost incredible; for, notwithstanding the elegance and just proportions of their work, they are so indefatigable, that in one day's time they will finish a honey-comb a foot long and six inches broad, capable of receiving three thousand bees. When the cells are completed, the queen takes possession of those she likes best, to deposit her eggs in, and the rest are left to be filled with honey. She lays one egg in each cell, and sometimes more than a hundred in a day; but what is most remarkable, as some affirm, she lays those eggs which are to produce common bees in cells of the common shape and size, those that are to become drones or males in larger cells, and in two or three great cells of a circular form, she deposits those which are to be females like herself. These eggs, having lain a short time in the cells, are hatched into white maggots, and are fed with honey for ten or twelve days, after which

the other bees close up the cells with a thin piece of wax; and under this covering they become gradually transformed into bees, in the same manner as silk-worms are changed into butterflies. Having undergone this metamorphosis, the young bees pierce through their waxen doors, wipe off the humidity from their little wings, take their flight into the fields, rob the flowers of their sweets, and are perfectly acquainted with every necessary circumstance of their future conduct.—As to the males or drones, which are destined only to propagate their species, they live very comfortably for about three months after they are hatched; but when that time is over, and the females are impregnated, the common bees either kill them or drive them from the hive as burdensome to the community, and not a drone is to be found till the next season.

Of the reciprocal affection subsisting between the queen and the working bees, we find a most interesting account in Mr. Warder's *Monarchy of Bees*, the substance of which we shall lay before our readers.

"Many years ago," says our author, "I wished to satisfy my curiosity respecting the queen bee, and was resolved to hazard the destroying of a single swarm for that purpose. One morning, about half an hour before sunrise, I took a swarm of bees that had been hived the day before, and carried it into a meadow near my garden; and there, with a smart stroke, shook out all the bees in a lump upon the grass. After they had recovered from the confusion which so violent a motion produced among them, I laid down on the ground, and, with a little stick, gently stirred among them in order to find the queen. I at length discovered her, and, shutting her in a box, carried her into my apartment, where I let her fly, and a few of the other bees which I had taken along with her. They, as was natural flew against the window. I therefore cut off one of her wings, and again shut her up in the box.

"I was now desirous to know how the other bees would act in the absence of their queen; and this I soon observed.—As soon as they discovered that she was not among them, they scattered themselves about in all directions, running up and down, with a most piteous and discontented note, in search of her. They spent about an hour in this fruitless search; after which they took wing,

and alighted on a nedge at a little distance. This was the nedge where the same swarm had pitched the morning before; and it almost appeared as though they had gone to search for her in a place where they recollected having been, but a little time ago, in company with her. And now, instead of collecting themselves into a bunch, as is their custom when the queen is present, they scattered themselves along the hedge for many yards, in little parties of forty or fifty together.

"Being desirous of knowing whether they would again acknowledge their crippled sovereign, I took the box from my pocket, and, having opened it, laid it on the bank, when the little wanderers immediately collected round it. Having thus found their queen again, they now continued in a cluster about her, and seemed perfectly happy and contented.

"Night coming on, I again hived them, and next morning knocked them out in the meadow as before; when they soon united themselves together about their sovereign. In this state I permitted them to continue for some hours, to observe whether they would rise; but in this the strength of their loyalty was fully evinced; for as the poor queen was unable to lead them to any place for their common preservation, her subjects chose rather to perish with her than to forsake her in distress.

"I again shut up the queen in my box; when the other bees, as before, spread themselves in every direction in search of her. Whilst they were in this situation, I put her down on one side of them: they all, in a moment, ceased their search, and advanced immediately towards her. Before she was quite concealed, I took her up, and put her in another place; when the bees all turned directly toward her again. After repeating this experiment a few times more, I suffered them to close round her. In this affecting situation they continued for the remainder of the day, not one of them offering to desert her, though by this time they must certainly have been very much in want of food. In the evening I hived them as before.

"On knocking them out the next morning, I formed a resolution of trying to what length these loyal creatures would carry their affection. They had now tasted no

food for two days; and their queen had at least equalled them in this; for though I had repeatedly offered her some honey, she would not even taste it without her beloved subjects. But to draw this curious, though melancholy narrative to a conclusion, I must observe that they still retained their integrity, and even famine itself could not diminish their affection; for, after living five days and nights without the least sustenance, they all died of hunger. The queen bee existed a few hours longer than the rest, but at length surrendered a life which the destruction of her friends had rendered comfortless and insupportable."

The method in which the bees collect their wax and honey deserves to be explained, and is particularly worthy of attention.—At the bottom of all flowers there are certain glands which contain more or less honey, that is, the most exalted particles of the sugary juices of the plant. These juices the bee sucks up with its proboscis or trunk, and draws it into its mouth; and when it has thus taken a sufficient quantity into its stomach, it returns to the hive, and discharges the honey into the common magazine. When the cells prepared to receive it are full, the bees close up some with wax till they have occasion for the honey; the rest they leave open, to which all the members of the society resort, and take their repast with great moderation.

It is an excellent observation of a modern author, that the hive is a school to which numbers of people ought to be sent: for prudence, industry, benevolence, patriotism, economy, neatness, and temperance, are all visible among the bees. These little animals are actuated by a social spirit, which forms them into a body politic, immediately united, and perfectly happy. They all labour for the general advantage; they are all submissive to the laws and regulations of the community; having no particular interest, nor distinction, but those which nature or the necessities of their young have introduced amongst them. We never see them dissatisfied with their condition, or inclinable to abandon the hive in disgust, at finding themselves slaves or necessitous. On the contrary, they think themselves in perfect freedom, and perfect affluence; and such indeed is their real condition. They are free, because

they only depend on the laws; and they are happy, because the concurrence of their several labours inevitably produces an abundance, which contributes to the riches of each individual. Human societies, compared with this, will appear altogether monstrous; for although necessity, reason and philosophy have established them for the commendable purposes of mutual aid and benefit, a spirit of selfishness too often destroys all; and one half of mankind, to load themselves with superfluities, leave the other destitute of common necessaries.

Naturalists have generally asserted, that the fine dust of the apices of flowers, collected amongst the hairs of the bee, which nature seems to have clothed it with for that purpose, was afterwards converted into wax; and some of the moderns, as well as the ancients, have imagined wax to be the excrement of this laborious insect: but the judicious Boerhaave supposes it to be a juice issuing from the leaves of plants, and adhering to their surface, where it is inspissated by the heat of the sun, as may be seen in rosemary by the help of a microscope. This the bees collect with their fore feet and jaws, and roll up into little balls, which they convey, one at a time, to the feet of their middle legs, and from thence to the middle joint of their hind legs, where there is a small cavity, like a spoon, to receive the burden. When those bees who are employed in collecting the wax return to the hive, they are assisted by their companions in discharging their load, who by little and little pick off the wax from their legs, and carry it to the common treasure. With this they build their combs, observing a wonderful frugality, not the least grain of it being wasted or neglected.

Thus, as an ingenious author observes, their indulgent Creator has given them all implements necessary, either for building their combs, or composing their honey. They have each a portable vessel, in which they bring home their collected sweets; and they have the most commodious store-houses, wherein they deposit them. They readily distinguish every plant, which affords materials for their business; and are complete practitioners in the arts of separation and refinement. They are aware, that the vernal bloom and summer sun continue but for a season; and are therefore eager to improve every shining

hour, and lay up a stock sufficient to supply the whole tate, till the return of their flowery harvest.

Bees are extremely solicitous to remove such insects or other foreign bodies as happen to get admission into the hive. When so light as not to exceed their powers, they first kill the insect with their stings, and then drag it out with their teeth. But it sometimes happens, that a snail intrudes upon their retirement, and, although it is soon stung to death, the bees are incapable of removing so heavy a burden. To prevent the noxious odours, therefore, which might result from the animal's putrefaction, they immediately cover every part of its body with propolis, through which no effluvia can escape. When a snail with a shell gets entrance, it is disposed of with much less trouble; for as soon as it receives the first wound from a sting, it naturally retires within its shell; and the bees, by glueing all round the margin of the shell, render it for ever immoveable.

Almost every one knows the great and various uses of wax and honey, the consumption whereof, throughout the several parts of Europe, is incredible; and if honey were more used than it is, instead of sugar, it would be found of excellent service. Being very penetrating and deterging, it is good in all obstructions, especially from viscid and tough humours. It wonderfully promotes expectoration; nor is there any disorder arising from phlegm, or the produce of a cold constitution, in which it is not serviceable. But it is to be observed, that there is a peculiarity in some constitutions, which renders them incapable of bearing the least quantity of honey without sickness and great uneasiness. In surgery, it is used to cleanse foul ulcers, either by immediate application, or washing them with liquors in which it has been dissolved

Considering, therefore, the advantages arising from the labours of bees, is it not strange that our country-people are not more solicitous about the preservation and increase of these animals? It is certain they would multiply prodigiously with proper management; and we might, upon a moderate computation, have five thousand times as much wax and honey produced in this kingdom as we have at present. But, instead of taking due care to keep them warm in winter, and to supply them with a sufficient quan-

tity of food, vast numbers are suffered to perish annually; and still greater numbers are destroyed with the loss of an immense future progeny, by smothering whole swarms in the hive, in order to obtain the honey.

The Greek bee-hives (according to Sir George Wheeler) are made of willows or osiers, and shaped like our common dust-baskets, being wider at top than at bottom, and plastered with clay both within and without. Across the top of the hive they lay broad flat sticks, covering them with clay and straw to secure them from the weather. To these sticks the bees fasten their combs, so that they may be taken out whole, one by one, with the greatest ease imaginable. In March or April, to prevent the bees from swarming and flying away, they separate with a knife the sticks to which the combs are fastened, taking out those on each side, and placing them in the same order in another hive, till they are equally divided. Then, having furnished each hive with more sticks, and covered them over as before, they set the new hive in the place of the old one, removing that to a neighbouring stand. This is done in the middle of the day, when the greatest part of the bees are abroad, who, at their return home, divide themselves without much difficulty, some taking to the new, and others to the old, habitation. In August they take out the honey after the same manner; that is, separating the sticks on each side, and taking away the combs, till they have left only such a quantity in the middle as they judge sufficient for the support of the bees in winter; brushing those on the combs into the hive again, and covering it afresh with sticks and plaster. This is also done in the day-time, when most of the bees are absent from the hive, and are, therefore, least disturbed themselves, and give their plunderers the least disturbance.

By this means the bees, instead of being destroyed, increase and multiply prodigiously, and make their masters ample amends for the little honey they leave them to feed upon in the winter. Besides, our author is of opinion, that the smoke of the sulphur used to destroy the bees diminishes the fragrancy of the wax, and cannot communicate any good flavour to the honey.

This is the account Sir George Wheeler gives of the management of bees at a Greek monastery on Mount

Hymettus, which is celebrated for the best honey in all Greece, and from whence a great quantity is sent to Constantinople. The same author mentions another monastery, called Pendeli, not far from Hymettus, which, in his time, was under the protection of the sultaness mother, and the monks were obliged to pay, upon that account, six thousand weight of honey every year to a new mosque which she built at Constantinople, and to furnish it with as much more at the price of five dollars the quintal. He adds, that the fathers have seldom less than five thousand stocks of bees, with a great deal of arable land, vineyards, plantations of olive-trees, herds of cattle, flocks of sheep, and all other conveniencies their manner of life requires.

The Greek method above related was introduced into France in 1754, as we are informed by M. de Reaumur and Du Hamel in the *Memoirs of the Royal Academy* for that year. In Scotland, Mr. Bonner has long saved the lives of his bees; and, throughout his new plan, reprobates the barbarous practice of murdering them; and various methods have also been adopted in England, to attain the desirable end of getting the honey and wax without destroying the bees.

The Rev. Mr. White informs us, that his fondness for these little animals soon put him upon endeavouring to save them from fire and brimstone; that he thought he had reason to be content to share their labours for the present, and great reason to rejoice if he could at any time preserve their lives, to work for him another year; and that the chief design of his experiments and observations has been to discover a cheap and easy method, by which even the poorest class of people may be enabled to take away a considerable quantity of honey without destroying the bees; and that they may by the same means encourage seasonable swarms.

In this gentleman's directions to make the bee-boxes of his inventing, he tells us, speaking of the construction of a single one, that it may be made of deal, or any other well-seasoned boards about an inch thick, which are not apt to warp or split. The figure of the box should be square, and its height and breadth nine inches every way, measuring within. The front part must have a door cut in the middle of the bottom edge, three inches wide, and

about half an inch in height, which will give full liberty to the bees to pass through, yet not be large enough for their enemy the mouse to enter. In the back part a hole should be cut, and glazed with a pane of fine crown glass, about five inches long and three broad; and the top of this glass should be placed as high as the roof within, that the upper part of the combs may be distinctly seen. The glass must also be covered with a thin piece of wood, by way of a shutter, which may be made to turn upon a nail, or to slide sideways between two mouldings. The side of the box, which is to be joined to another box of the same form and dimensions, as it will not be exposed to the internal air, may be made of a piece of slit deal not half an inch thick. This the amiable projector calls the *side of communication*, because it is not to be wholly enclosed: a space is to be left at the bottom, the whole breadth of the box, and a little more than an inch in height; and a passage is to made at the top, three inches long, and rather more than half an inch wide. Through these the bees are to have a communication from one box to the other. Next, says our author, provide a loose board, half an inch thick, and large enough to cover the side where the communications are made; and have in readiness several iron staples, about an inch and a half long, with their points bent down rather more than half an inch. Then fix two sticks across the box from side to side, in order to be a stay to the combs,—one about three inches from the bottom, and the other at the same distance from the top; and when the whole is painted, to make it more durable, the box is completed.

The judicious bee-master, continues our author, will here observe, that the form of the box now described is as plain as possible. It is, indeed, little more than five square pieces of board nailed together; so that a poor cottager, who has merely ingenuity enough to saw a board into the given dimensions, and to drive a nail, may make his own boxes without the assistance of a carpenter. The two boxes differ from each other only in this, that the side of communication of the one must be on the right hand, that of the other on the left.

After observing that no true lover of bees ever lighted the fatal match without much concern, and that is is evi-

dently more to our advantage to spare the lives of our bees, and be content with part of their stores, than to kill and take possession of the whole, Mr. White lays down the following plan for the preservation of these industrious creatures:—About the end of August, by a little inspection through the glasses, we may easily discover which of the colonies may be laid under contribution. Such as have filled a box and a half with their works will pretty readily yield the half box; but we must not depend upon the quantity of combs without examining how they are stored with honey. The bees should have eight or nine pounds of honey left them as a remuneration for their summer's work. The most proper time for this business is the middle of the day; and no armour is required except a pair of gloves. The operation should be performed thus:—Open the mouth of the box intended to be taken; then, with a thin knife, cut through the resin with which the bees have joined the boxes together, and thrust in a sheet of tin to stop the communication. The bees in the fullest box, where the queen is most likely to be, will be rather disturbed at this operation; but those in the other box will run to and fro in the utmost confusion, and send forth a mournful cry, which may be plainly distinguished from their other notes. They will also issue out at the newly opened door, by one or two at a time, and in visible disorder. But this is soon over; for, as soon as they get abroad and discover their companions, they immediately join them at the mouth of the other box. By this means, in about a couple of hours, a box of pure honey may be got without leaving a bee in it; and likewise without any dead bees, which, in the old practice of burning them are frequently mixed with the honey, which is consequently both wasted and damaged.

Mr. Wildman, whose remarks on the management of bees are pretty generally known, possessed a secret by which he could cause a hive of bees to swarm upon his head or shoulders in a most surprising manner; and he has been seen to drink a glass of wine with the bees all over his head and face more than an inch deep. It is also said, that he could act the part of a general with them, by marshalling them in battle array upon a large table. He divided them into regiments, battalions, and companies,

according to military discipline; and, on his uttering the word *march!* they began to move very regularly, in the manner of soldiers. He even taught his bees so much politeness, that they never attempted to sting any of the numerous visitants who frequently resorted to admire so interesting a spectacle.

THE WHITE ANT OF INDIA.

Of the white ant a most interesting description has been given by Mr. Henry Smeathman, in the *Philosophical Transactions* for 1781. According to this account, the works of these insects surpass those of the bees, wasps, and other animals, as much as those of the most polished European nations excel those of uncultivated savages; and even with respect to man, his greatest works, the boasted pyramids, fall, comparatively, far short, even in size alone, of the structures raised by these industrious insects. The labourers among them employed in this service are not a quarter of an inch in length, but the structures which they erect rise to ten or twelve feet above the surface of the earth. Supposing, therefore, the height of a man to be six feet, our author calculates that the buildings of these insects, relatively to their size and that of a man, may be considered as raised to nearly five times the height of the greatest Egyptian pyramid. And it may be added, that with respect to the interior construction, and the various members and dispositions of the parts of the building, they certainly appear to exceed every work of human construction.

The most curious parts of these structures are, the royal apartments, nurseries, magazines of provision, arched chambers, and galleries, with their various communications; the ranges of Gothic-shaped arches, projected, and not formed by mere excavation, some of which are two or three feet high, but which diminish rapidly, like the arches of aisles in perspective; the various roads, sloping staircases, and bridges, consisting of one immense arch, and constructed to shorten the distance between the several parts of the building, which would otherwise communicate only by winding passages.

The economy of these insects appears to have been very minutely observed by an ingenious author; who informs us, that there are three distinct ranks or orders among them, constituting a well-regulated community. These are, first, the *labourers* or working insects; next, the *soldiers*, or fighting class, which do no kind of labour, and are much larger than the former; and, lastly, the winged, or perfect insects, which may be called the *nobility* of the state; for they neither labour nor fight, being scarcely capable even of self-defence. These only are capable of being elected *kings* or *queens;* and Providence has so ordered it, that they emigrate within a few weeks after their elevation to the sovereignty, and either establish new kingdoms, or perish within a day or two.

The first order, the working insects, are most numerous; being in the proportion of a hundred to one of the soldiers. In this state they are only about a quarter of an inch long, and so extremely small, that twenty-five of them will scarcely weigh one grain.

The second class, or soldiers, have a very different form from the labourers, and have been by some authors supposed to be the males, and the former neuters; but they are, in reality, the same insects as the foregoing, only they have undergone a change of form, and approached one degree nearer to the perfect state. They are about half an inch long, and equal in bulk to fifteen of the labourers.

The third order, or the insect in its perfect state, varies its form still more than ever. The head, throat, and belly, differ almost entirely from the same parts in the labourers and soldiers; and besides this the animal is now furnished with four large transparent wings, with which it is, at the time of emigration, to wing its way in quest of a new settlement, These are equal in bulk to two soldiers and about thirty labourers; and by means of the wings with which they are furnished, they roam about for a few hours; at the end of which time they lose their wings, and become the prey of innumerable birds and reptiles: while scarcely one pair out of many millions of this unhappy race get into a place of safety, fulfil the first law of nature, and lay the foundation of a new community.

The few fortunate pairs who survive this annual destruction are casually found by some of the labourers, and

are elected kings and queens of new states. By these industrious creatures the king and queen elect are immediately protected and enclosed in a chamber of clay, where the business of propagation soon commences. Their voluntary subjects then busy themselves in constructing nurseries, or apartments, entirely composed of wooden materials, and seemingly joined together with gums. Into these they afterwards carry the eggs produced from the queen*; and here the young are attended, after they are hatched, until they are able to shift for themselves.

For the many singular accounts given of the police of these insects, we shall mention one respecting the different functions of the labourers and soldiers, or the civil and military establishments in this community, on an attempt to explore their nest.

On making a breach in any part of the structure with a hoe or pick-axe, a soldier immediately appears, and walks about the breach, as if to see whether the enemy be gone, or to examine whence the attack proceeds. In a short time he is followed by two or three others, and soon afterwards by a numerous body, who rush out as fast as the breach will permit; their numbers increasing as long as any one continues to batter the building. During this time they are in the most violent bustle and agitation; while some of them are employed in beating with their forceps upon the building, so as to make a noise that may be heard at three or four feet distant. On ceasing to disturb them, the soldiers retire, and are succeeded by the labourers, who hasten in various directions towards the breach, each with a burden of mortar in his mouth ready tempered. Though there are millions of them they never stop nor embarrass each other; and a wall gradually rises that fills up the chasm. A soldier attends every 600 or 1,000 of the labourers, seemingly as a director of the

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* After impregnation a very extraordinary change takes place in the queen; for her belly gradually increases in bulk, and, at length, becomes of such an enormous size, that she exceeds twenty or thirty thousand times the bulk of one of the labourers, and becomes a thousand times heavier than her consort. In this state the matrix has a constant undulating motion, the consequence of which is (according to our author's actual observation) the protrusion of eighty thousand eggs in twenty-four hours.

works; for he never touches the mortar either to lift or carry it. One in particular places himself close to the wall which they are repairing, and frequently makes the noise above-mentioned; which is constantly answered by a loud hiss from all the labourers within the dome: and at every such signal, they evidently redouble their pace, and work as fast again.

The work being completed, a renewal of the attack constantly produces the same effects. The soldiers again rush out, and then retreat, and are followed by the labourers loaded with mortar, and as active and diligent as before. Thus says our author, the pleasure of seeing them come out to fight or to work alternately may be obtained as often as curiosity excites or time permits; and it will certainly be found, that the one order never attempts to fight, nor the other to work, let the emergency be ever so great. The obstinacy of the soldiers is very remarkable: they fight to the last extremity, disputing every inch of ground so effectually as often to drive away the negroes who are without shoes, and make Europeans bleed plentifully through their stockings.

Many curious and striking particulars are related of the great devastations committed by this powerful community, which construct roads, or covered ways, diverging in all directions from the nest, and leading to every object of plunder within their reach. Though the mischiefs they commit are very great, yet such is the economy of nature, that these are counterbalanced by their destruction of dead trees, and other substances, which, by a tedious decay, would only serve to encumber the face of the earth. Such is their alacrity and despatch in this office, that the total destruction of deserted towns is so effectually accomplished, that in two or three years a thick wood fills the space; and not the least vestige of a house is to be discovered.—SMITH's *Wonders*.

GREAT WEST-INDIA SPIDER.

It is said there are no venomous creatures of any kind in the Bermudas, but, perhaps, a greater variety of insects than in any other of our plantations in proportion to their

size. Amongst these the spiders are very remarkable, for their extraordinary size and the strength of their webs. Their bodies consist of two parts, one flat, the other round, and both together, with the legs stretched out, are large enough to cover a man's hand. This monstrous bulk makes them look frightful, but the beauty and variety of their colours in some measure take off the distaste. The round part of their body is shaped much like a pigeon's egg, and under the flat part grow their legs, five on each side, with four joints, and claws at the end. They have a little hole in their backs, and their mouths are covered with greyish hairs, intermixed with some red, and have a crooked tooth on each side, of a hard polished substance, and of a bright shining black; so that they are often set in gold or silver, to serve for tooth-picks.

When these creatures grow old, they are covered all over with a sort of down, of a brown or blackish colour, very smooth, soft, and shining like velvet; and it is said they cast their downy skins every year, as well as the two teeth just mentioned. They show a wonderful skill and agility in spreading their webs from tree to tree, which, are so very large and strong, as to extend seven or eight fathoms, and when finished will ensnare a bird as big as a thrush.

FLYING-TIGER.

Among the insects found in Nevis, and other neighbouring islands, some travellers mention a curious one called the flying-tiger, because its body, like that of a tiger, is marked with spots of various colours. It is about the size of a large beetle, has a sharp-pointed head, and two large eyes as green and sparkling as an emerald. Its mouth is armed with two very sharp hooks, with which it holds its prey; and its whole body is covered with a brownish crusty tegument. Under its two largest wings, which are also of a solid matter, are four lesser wings as thin as the finest silk. It has six legs, each of which has three joints, and is beset with little prickles. In the day-time it is continually pursuing

other insects which are its prey; and in the night it lodges on the trees, where it makes a noise almost like a grasshopper.—SMITH'S *Wonders.*

THE HORNED FLY.

IN Nevis, and other West India islands, there are horn-flies of several sorts, particularly one about three inches long, which has two snouts like an elephant, the one turning upwards, the other downwards. It has a blue head, with two green eyes, encompassed by a small white circle. Out of its back rises a horn, shaped like a woodcock's bill, smooth on the upper side, and covered with down on the lower; which horn reaches to its head, where it has another resembling that of a beetle, black as ebony, and as clear as glass. Its wings are of a violet-colour, intermixed with carnation; and where the upper ones are expanded two lesser ones may be seen under them, as thin as those of the flying-tiger, and red as scarlet.

FLY-CATCHING INSECT.

IN the Bermudas, and other Western islands, there is a pretty little insect with four legs, called a fly-catcher, whose colours are various and beautiful. It comes boldly into rooms, and will even light upon the table when people are eating, and catch the flies that crawl upon their clothes. Its method is to lie waiting for the flies, and, when it sees an advantage, it leaps directly on its prey, which it seldom misses. The small eggs these insects lay, they cover slightly with earth, and leave them to be hatched by the sun.—SMITH'S *Wonders.*

ANIMALCULES.

Mark'd by the magnifying crystal's aid,
In every place what proofs will stand display'd;
Lo! from the stagnant pool one drop obtain,
Of insects, this includes a sumless train:
Buoy'd in the little pool they frisk and play,
Pleas'd with their short existence of a day.—BROWNE.

VORTICELLA RACEMOSA.

THIS most elegant animalcule is found during the summer months in clear stagnant waters, attached to the stalks of the smaller water-plants and other objects; to the naked eye, the whole group, on account of the great number of individuals composing it, is distinctly visible, in the form of a small whitish spot, resembling a kind of slime or mouldiness, but when placed under the microscope in a drop of water on a glass, its extraordinary structure is immediately perceived. From a single stem proceed at various distances, several smaller ramifications, each terminated by an apparent flower, like that of a convolvulus, and furnished on the opposite edges, with a pair of filaments resembling stamina. The whole is in the highest degree transparent, and perfectly resembles the finest glass; while the varying motions of the seeming flowers, expanding and contracting occasionally, and turning themselves in different directions, afford a scene so singularly curious, as to be numbered among the finest spectacles which the microscope is capable of exhibiting. Each animal, though seated on the common stem, is complete in itself, and possesses the power of detaching itself from the stem, and forming a fresh colony for itself.—DR. SHAW'S *Zoological Lectures.*

VORTICELLA ROTATORIA, OR WHEEL-ANIMAL.

To the genus Vorticella, just described, also belongs the celebrated animalcule called the wheel-animal, from the appearance which the head in some particular posi-

tions exhibits; as it is furnished with a pair of toothed wheels, in rapid motion. This animalcule, which is called *Vorticella rotatoria*, has been well described and figured by Mr. Baker in his work on the microscope: it is of a lengthened shape, and of a pale brown colour, and is of such a size as to be sometimes perceptible by a sharp eye, even without a glass. It is remarkable for its strange power of reviviscence, or restoration to life and motion, after being dried many months on a glass. The wheel-animal is often found on the scum covering the surface of stagnant waters, but more frequently in the water found in the hollows of decayed trees after rain.—Dr. Shaw.

VOLVOX GLOBATOR.

The genus, called *Volvox*, also presents one of the largest and most curious of animalcules, as well as one of the most beautiful, the chief species, or *Volvox Globator*, often equalling the size of a pin's head. In the advanced state of spring, and again in autumn, it appears in immense numbers in the clearer kind of stagnant waters. Its general colour is green; but it is sometimes of a pale orange colour. Its motions are irregular, in all directions, and at the same time rolling or spinning as if on an axis. When microscopically examined, it presents one of the most curious phenomena in natural history, being always pregnant with several smaller animals of its own kind, and these with others still smaller; the whole external surface is covered with very numerous small tubercles: which some have supposed to act as a kind of fins, while others have supposed them to be the valves of so many orifices which the creature can either open or close at pleasure, in order to manage its various motions. When groups of these beautiful animalcules are viewed by the solar miscroscope, they strongly recall to the recollection of the spectator, the magnificent scene in Mr. Walker's Edouranion, representing numerous worlds revolving in various directions.—Dr. Shaw.

VIBRIO ANGUILLULA, OR EEL VIBRIO.

This animalcule inhabits acid paste made of flour and water, or such as is used for the common purposes of bookbinding, and the other variety is often found in common vinegar. The paste vibrio is distinctly visible to a good eye without a glass, and when full grown measures the tenth of an inch in length: it is viviparous, and frequently produces a tribe of young. Its general appearance when magnified is that of an eel. This animalcule, from its size, and the ease with which it may at all times be kept and observed, is particularly interesting. It generally swarms on the surface of the paste, and often coats the sides of the vessel in which it is kept, often forming a kind of ramification, resembling the branched appearance of frost on a window: this is particularly observable in rainy weather.—Dr. Shaw's *Zoological Lectures*.

HYDRA, OR POLYPE.

These curious animals are found adhering to the stems of aquatic plants, or to the under surfaces of the leaves. The species are multiplied by vegetation, one or two or even more young ones emerging gradually from the sides of the parent animal; and these young are frequently again prolific, so that it is not uncommon to see two or three generations at once in the same polype. But the most curious particular respecting this animal is, its multiplication by dissection. It may be cut in every direction, and even into very minute divisions, and not only the parent stock will remain uninjured, but *every section will become a perfect animal.* Even when turned inside out, it suffers no material injury; for in this state it will soon begin to take food, and to perform all its other animal functions.—*Time's Telescope.*

If a polype be cut in two, the fore part, which contains the head and mouth and arms, lengthens itself, creeps and eats the same day. The tail part forms a head and mouth at the wounded end, and pushes forth arms, more or less speedily according to the warmth of

the weather. If the polype be cut lengthways, each part is half a pipe, with half a head, &c,: the edges of these halves gradually round themselves, and unite, beginning at the tail end, and the half mouth and half stomach of each become complete. Polypes are very voracious creatures, and will swallow worms or insects twice as big as themselves.—*Joyce on the Microscope.*

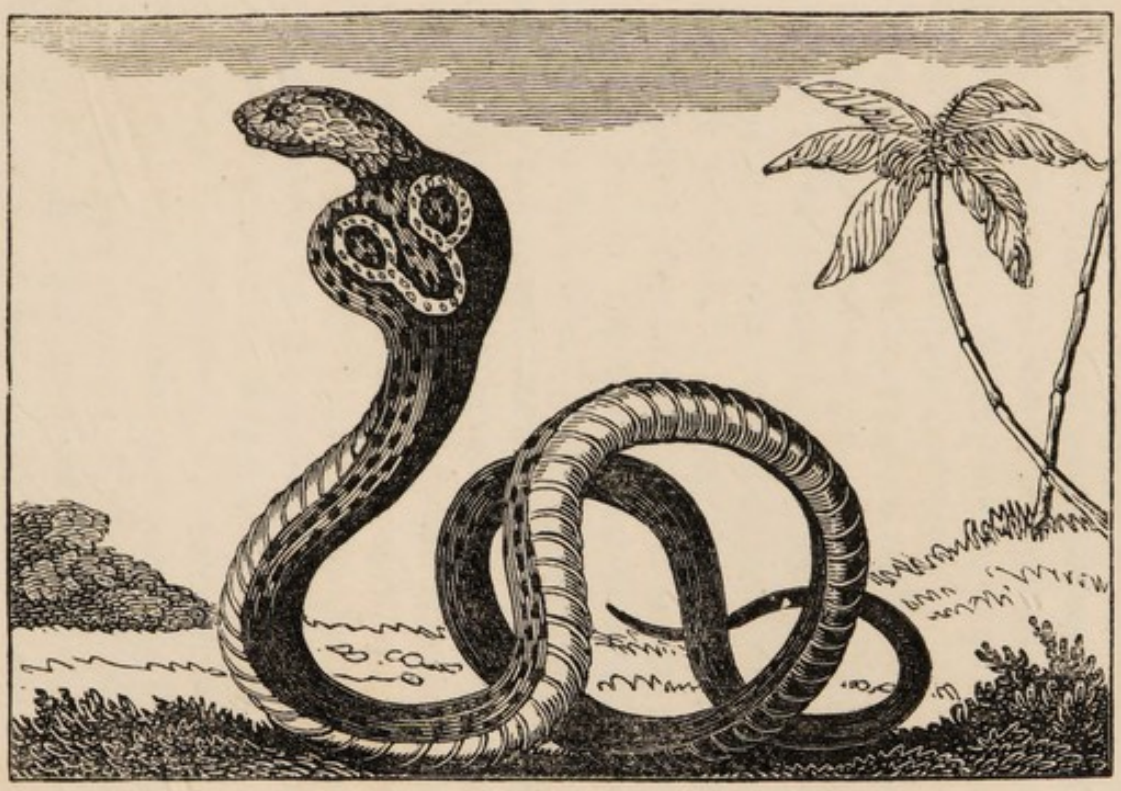
SERPENTS AND SNAKES.

THE SERPENTS OF INDIA.

Among the serpents of India the cobra-minelle is the smallest, and most dangerous; the bite occasions a speedy and painful death. They are of a brown colour, speckled with black and white, though at a distance not easily distinguished from the ground on which they move; and happy would it be if they confined themselves to it; but they enter the houses, and creep upon the beds and chairs; I once found four, and at another time five, in my chamber up stairs.

The cobra de capello, or hooded snake *(coluber naja,)* called by the Indians, the *naag*, or *nagao*, is a large and beautiful serpent; but one of the most venomous of all the coluber class; its bite generally proves mortal in less than an hour. It it called the *hooded-snake*, from having a curious hood near the head, which it contracts or enlarges at pleasure; the centre of this hood is marked in black and white like a pair of spectacles, from whence it is also named the spectacle snake.

Of this genus are the dancing-snakes, which are carried in baskets throughout Hindostan, and procure a maintenance for a set of people, who play a few simple notes on the flute, with which the snakes seem much delighted, and keep time by a graceful motion of the head; erecting about half their length from the ground, and following the music with gentle curves, like the undulating lines of a



THE HOODED SNAKE.

swan's neck. It is a well-attested fact, that when a house is infested with these snakes, and some others of the coluber genus, which destroy poultry and small domestic animals, as also by the larger serpents of the boa tribe, the musicians are sent for; who, by playing on a flageolet, find out their hiding-places, and charm them to destruction: for no sooner do the snakes hear the music, than they come softly from their retreat, and are easily taken. I imagine these musical snakes were known in Palestine, from the Psalmist comparing the ungodly to the deaf adder, which stoppeth her ears, and refuseth to hear the voice of the charmer, charm he never so wisely.

When the music ceases the snakes appear motionless; but if not immediately covered up in the basket, the spectators are liable to fatal accidents. Among my drawings is that of a cobra de capello, which danced for an hour on the table while I painted it; during which I frequently handled it, to observe the beauty of the spots, and especially the spectacles on the hood, not doubting but that its venomous fangs had been previously extracted. But the next morning my upper servant, who was a zealous Mussulman, came to me in great haste, and desired I would instantly retire, and praise the Almighty for my good fortune: not understanding his meaning, I told him that I had already performed my devotions, and had not so many stated prayers as the followers of his prophet. Mahomed then informed me, that while purchasing some fruit in the bazar, he observed the man who had been with me on the preceding evening, entertaining the country people with his dancing snakes; they, according to their usual custom, sat on the ground around him; when, either from the music stopping too suddenly, or from some other cause irritating the vicious reptile which I had so often handled, it darted at the throat of a young woman, and inflicted a wound of which she died in about half an hour. Mahomed once more repeated his advice for praise and thanksgiving to Alla, and recorded me in his calendar as a lucky man.

Dr. Russell, in his valuable treatise on Indian serpents, has distinguished between the venomous and the harmless species, in the three genera of boa, coluber, and anguis: he has given an accurate description, and coloured en-

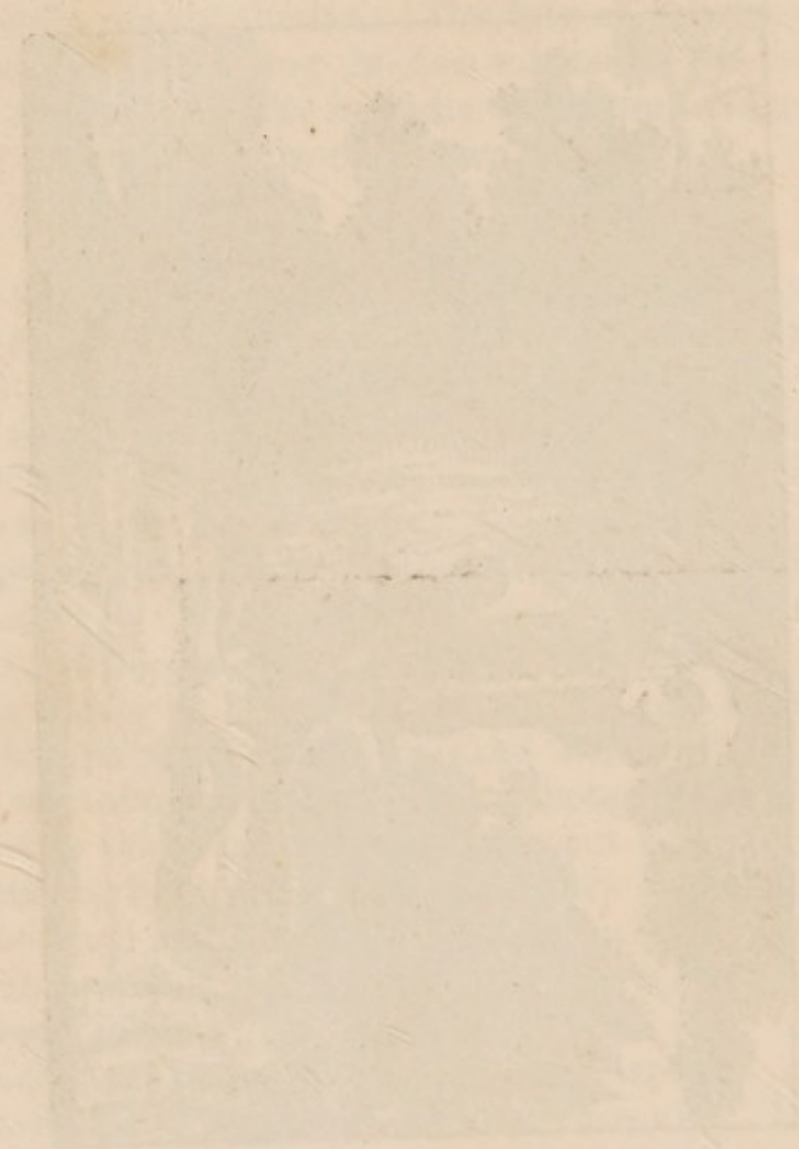
gravings of forty-three of the most common serpents in Hindostan; with observations on the apparatus provided by nature, for preparing and instilling their poison: he mentions, that a quantity of warm Madeira wine taken internally, with an outward application of eau-de-luce on the punctures, was generally successful in curing the bite of the most venomous species; and that the medicine called the Tanjore-pill seemed to be equally efficacious. It may in general be remarked, that all serpents produce morbid symptoms nearly similar. The bite of a rattle-snake, in England, killed a dog in two minutes; the bite of the most pernicious snake in India was never observed to kill a dog in less than twenty-seven minutes.

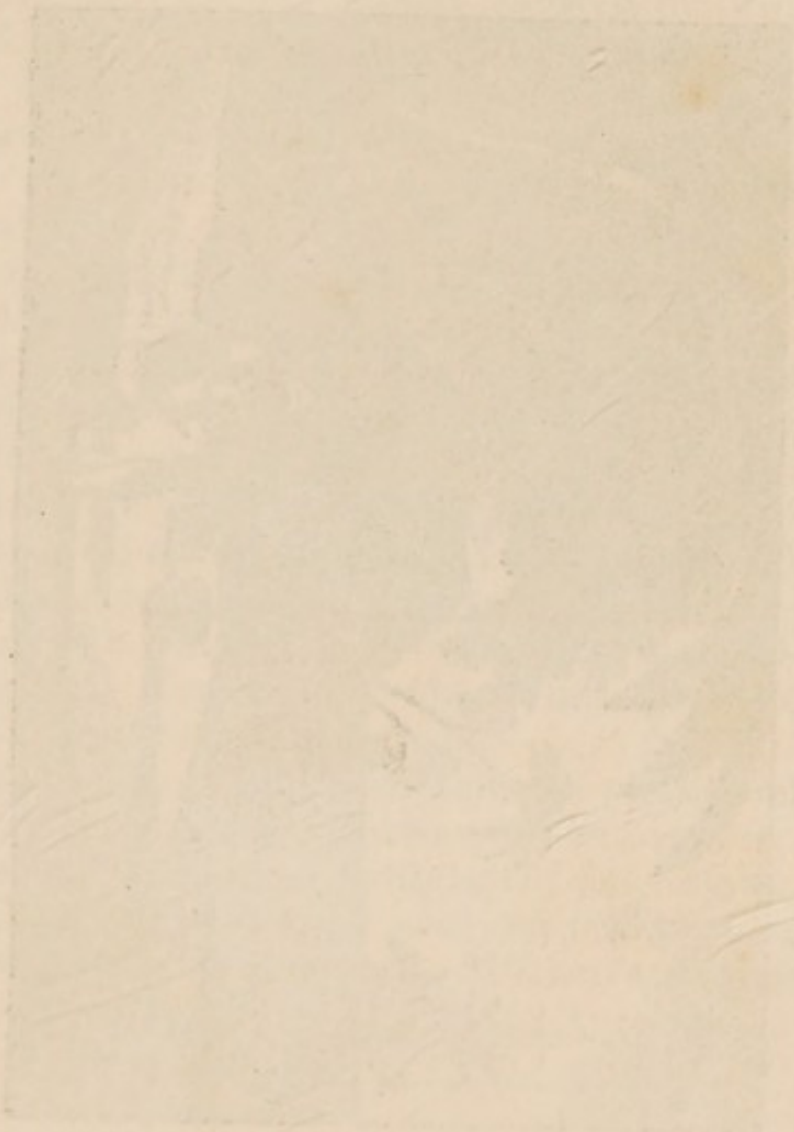
BOA CONSTRICTOR.

One of these animals was brought to England in the Cæsar; he was a native of Borneo, and was put on board in a wooden cage, with a sliding door. Six goats were sent with him; one a month being considered a fair allowance. When he was fed, the sliding door being opened, one of the goats was thrust in, and the door shut. The poor victim, as if aware of the horrors of its situation, uttered the most piercing cries, butting at the same time towards the serpent as in self-defence.

The snake at first scarcely noticed the animal, but at length turning its head, he fixed his deadly eye on the goat, who shook in every limb; though it still continued to butt at the serpent, who darted out his forked tongue, and raising his head a little, suddenly seized the goat by the fore-leg with his fangs, and throwing it down, encircled it in his folds, which resembled a knot, one part of the body overlaying the other. The half stifled cries of the goat soon became extinct, and it expired in his merciless grasp. The snake, however, held him a considerable time. He then slowly unfolded himself, and prepared for swallowing the goat, by placing his mouth in front of the head of the dead animal, which he lubricated with his saliva; then taking the muzzle in his mouth, sucked it in as far as the horns would allow; these opposed a little difficulty from their points, but they soon disappeared externally, though their progress was still very distinct on the out-

BOA CONSTRICTOR.





THE BREAD-FRUIT TREE.

side, threatening every moment to protrude through the skin. The victim was now swallowed as far as the shoulders; and it was an astonishing sight to observe the extraordinary action of the snake's muscles when stretched to such an unnatural extent. When his head and neck had no other appearance than that of a serpent's skin, stuffed almost to bursting, still the working of the muscles were evident, and unabated; this seemed to be the effect of a contractile muscular power, assisted by two rows of strong hooked teeth. With all this he must be so formed as to be able to suspend his respiration for a time, for it is impossible to conceive that the process of breathing could be carried on while the mouth and throat were so completely stuffed and expanded by the body of the goat. The whole operation of completely gorging the animal, occupied about two hours and twenty minutes: at the end of which time the tumefaction or swelling was confined to the middle part of the body or stomach, the mouth and throat having resumed their natural size. The reptile now coiled himself up again, and laid quietly in his usual torpid state for about three weeks or a month, when his last meal appearing to be completely dissolved, he was presented with another goat, which he devoured with equal facility. Few of those who witnessed his first meal wished to be present at the second.

It is impossible to behold without the most painful sensation, the anxiety and trepidation of the harmless victim, or to observe the hideous writhings of the serpent around his prey, and not to imagine what our own case would be in the same dreadful situation.—M'Leod's *Voyage of the Alceste.*

REMARKABLE TREES

BREAD-FRUIT TREE.

Though this tree has been mentioned by many voyagers, particularly by Dampier, by Rumphius, and by Lord Anson, yet very little notice seems to have been taken of

it till the return of Captain Wallis from the South Seas, and since that time by others who have touched at Otaheite and some countries in the East Indies.

Captain Cook, in his voyage, observes, that this fruit not only serves as a substitute for bread among the inhabitants of Otaheite and the neighbouring islands, but also, variously dressed, composes the principal part of their food. It grows on a tree that is about the size of a middling oak; its leaves are frequently a foot and a half long, of an oblong shape, deeply sinuated like those of the fig-tree which they resemble in colour and consistence, and in the exsuding of a milky juice upon being broken. The fruit is about the size and shape of a small melon, and the surface is reticulated not much unlike a truffle; it is covered with a thin skin, and has a core about as big as the handle of a small knife. The eatable part lies between the skin and the core; it is as white as snow, and somewhat of the consistence of new bread; it must be roasted before it is eaten, being first divided into three or four parts; its taste is insipid, with a slight sweetness, somewhat resembling that of the crumb of wheaten bread mixed with a Jerusalem artichoke. This fruit is also cooked in a kind of oven, which renders it soft, and something like a boiled potatoe; not quite so farinaceous as a good one, but more so than those of the middling sort. Of the bread-fruit they also make three dishes, by putting either water or the milk of the cocoa-nut to it, then beating it to a paste with a stone pestle, and afterwards mixing it with ripe plantains, bananas, or the sour paste, which they call *mahie*.

The mahie, which is likewise made to serve as a succedaneum for ripe bread-fruit before the season comes on is thus made: the fruit of the bread-tree is gathered just before it is perfectly ripe; and being laid in heaps, is closely covered with leaves; in this state it undergoes a fermentation, and becomes disagreeably sweet; the core is then taken out entire, which is done by gently pulling out the stalk, and the rest of the fruit is then thrown into a hole which is dug for that purpose, generally in the houses, and neatly lined in the bottom and sides with grass: the whole is then covered with leaves, and heavy stones laid upon them; in this state it undergoes a second

THE BANYAN TREE.

fermentation, and becomes sour, after which it will suffer no change for many months. It is taken out of the hole as it is wanted for use; and being made into balls, it is wrapped up in leaves and baked: after it is dressed it will keep five or six weeks. It is eaten both cold and hot, and the natives seldom make a meal without it, though to Europeans the taste is as disagreeable as that of a pickled olive generally is the first time it is eaten. The fruit itself is in season eight months in the year, and the mahie supplies the inhabitants during the other four.

To procure this principal article of their food (the bread fruit) costs these happy people no trouble or labour, except climbing up a tree. The tree which produces it does not indeed grow spontaneously; but if a man plants ten of them in his life time, which he may do in about an hour, he will as completely fulfil his duty to his own and future generations, as the native of our less temperate climate can do by ploughing in the cold of winter, and reaping in the summer's heat, as often as these seasons return; even if, after he has procured bread for his present household, he should convert a surplus into money, and lay it up for his children.—*Encyclopedia Britannica.*

BANIAN TREE.

The banian, or burr, tree, *(ficus Indica Lin.)* is equally deserving our attention, from being one of the most curious and beautiful of nature's productions in that genial climate, where she sports with the greatest profusion and variety. Each tree is in itself a grove; and some of them are of an amazing size, as they are continually increasing, and, contrary to most other animal and vegetable productions, seem to be exempted from decay; for every branch from the main body throws out its own roots, at first in small tender fibres, several yards from the ground, which continually grow thicker, until, by a gradual descent, they reach its surface,—where, striking in, they increase to a large trunk, and become a parent tree, throwing out new branches from the top. These in time suspend their roots, and receiving nourishment from the earth, swell into trunks, and shoot forth other branches; thus continuing

in a state of progression so long as the first parent of them all supplies her sustenance.

A banian tree, with many trunks, forms the most beautiful walks, vistas, and cool recesses, that can be imagined. The leaves are large, soft, and of a lively green; the fruit is a small fig,—when ripe of a bright scarlet, affording sustenance to monkeys, squirrels, peacocks, and birds of various kinds, which dwell among the branches.

The Hindoos are particularly fond of this tree; they consider its long duration, its out-stretching arms, and over-shadowing beneficence, as emblems of the Deity, and almost pay it divine honours.—The Brahmins, who thus "find a fane in every sacred grove," spend much of their time in religious solitude under the shade of the banian tree; they plant it near the dewals, or Hindoo temples, improperly called pagodas; and in those villages where there is no structure for public worship, they place an image under one of these trees, and there perform a morning and evening sacrifice.

These are the trees under which a sect of naked philosophers, called Gymnosophists, assembled in Arrian's days; and this historian of ancient Greece gives us a true picture of the modern Hindoos. In winter, the Gymnosophists enjoy the benefit of the sun's rays in the open air; and in summer, when the heat becomes excessive, they pass their time in cool and moist places under large trees, which, according to the accounts of Nearchus, cover a circumference of five acres, and extend their branches so far that ten thousand men may easily find shelter under them.

There are none of this magnitude at Bombay; but on the banks of Nerbudda I have spent many delightful days, with large parties, on rural excursions, under a tree, supposed by some persons to be that described by Nearchus, and certainly not at all inferior to it. High floods have, at various times, swept away a considerable part of this extraordinary tree; but what still remains is nearly two thousand feet in circumference, measured round the principal stems; the over-hanging branches, not yet struck down, cover a much larger space, and under it grow a number of costard-apple and other fruit-trees. The large trunks of this single tree amount to three hundred and fifty, and

the smaller ones exceed three thousand; each of these is constantly sending forth branches and hanging roots, to form other trunks, and become the parents of a future progeny.—FORBES.

COCOA-NUT TREE.

OF all the gifts which Providence has bestowed on the oriental world, the cocoa-nut tree most deserves our notice. In this single production of nature what blessings are conveyed to man! It grows in a stately column, from thirty to fifty feet in height, crowned by a verdant capital of waving branches, covered with long spiral leaves; under this foliage, bunches of blossoms, clusters of green fruit, and others arrived at maturity, appear in mingled beauty. The trunk, though porous, furnishes beams and rafters for our habitations; and the leaves, when platted together, make an excellent thatch, and common umbrellas, coarse mats for the floor, and brooms; while their finest fibres are woven into very beautiful mats for the rich. The covering of the young fruit is extremely curious, resembling a piece of thick cloth, in a conical form, close and firm as if it came from the loom; it expands after the fruit has burst through its inclosure, and then appears of a coarser texture. The nuts contain a delicious milk, and a kernel sweet as the almond; this, when dried, affords abundance of oil,—and, when that is expressed, the remains feed cattle and poultry, and make a good manure. The shell of the nut furnishes cups, ladles, and other domestic utensils; while the husk, which encloses it, is of the utmost importance; it is manufactured into ropes, and cordage of every kind, from the smallest twine to the largest cable, which are far more durable than those of hemp. In the Nicobar islands the natives build their vessels, make the sails and cordage, supply them with provisions and necessaries, and provide a cargo of arrack, vinegar, oil, jaggree or coarse sugar, cocoa-nuts, coir, cordage, black paint, and several inferior articles for foreign markets, entirely from this tree.

Many of the trees are not permitted to bear fruit; but the embryo bud, from which the blossoms and nuts would

spring, is tied up to prevent its expansion; and a small incision being then made at the end, there oozes, in gentle drops, a cool pleasant liquor, called tarce, or toddy, the palm wine of the poets. This, when first drawn, is cooling and salutary; but, when fermented and distilled, produces an intoxicating spirit. Thus a plantation of cocoa-nut trees yields the proprietor a considerable profit, and generally forms part of the government revenue.

The cocoa-nut tree delights in a flat sandy soil, near the sea, and must be frequently watered; while the palmyras, or brab trees, grow on hills and rocky mountains. These also abound in the Nicobar islands, as well as the date tree; but the fruit of the latter seldom attains perfection. These trees are of the same genus, though differing according to their respective classes; they all produce the palm wine, and are generally included under the name of palms or palmettoes.—*From* FORBES's *Oriental Memoirs.*

SANDAL TREE.

THE sandal tree is indigenous on the rocky hills in the Onore districts, and, if permitted, would grow to a tolerable size; but the wood is so valuable, that the tree is cut down at an early stage, and we seldom meet with any more than a foot broad. The wood is either red, yellow, or a whitish brown; and, from its colour and size, is called the first, second, and third, sort of sandal wood, each varying in price: the best varies in price from 150 to 200 rupees the caury, of 560 pounds weight. The wood of the brightest colour and strongest scent is most esteemed, having a fine grain and an aromatic smell, which it communicates to every thing near it; it is, therefore, much used in small cabinets, escritoires, and similar articles, as no insect can exist, nor iron rust, within its influence. From the dust and shavings is extracted an aromatic oil. The oil and wood are used by the Hindoos and Parsees in their religious ceremonies; but the greatest part of the latter is reserved for the China markets, where it sells to great advantage.

The sandal is a beautiful tree; the branches regular

and tapering; the leaf like the narrow willow, shorter, and delicately soft; the blossoms hang in bunches of small flowers, either red or white, according to the colour of the wood; the fruit is small, and valuable only for its seed. The tree thrives in a hilly rocky situation, and there produces wood of the finest grain and strongest scent. On low land, and a richer soil, it degenerates, and is, in all respects, less esteemed.—JAMES FORBES, ESQ., F.R.S., *&c.*

THE PALM TREE.

DR. CLARKE gives the following description of this very beautiful and useful tree:

We continued our journey, says the doctor, to Aboukir, along the sandy neck of land which stretches, in the shape of a ribbon, from the place where our army landed entirely to Alexandria, having the lake of Aboukir upon our right, and the sea upon our left. The whole of this tract is a desert, interspersed here and there with a few plantations of palm-trees. The dates hung from these trees in such large and tempting clusters, although not quite ripe, that we climbed to the tops of some of them, and bore away with us large branches* with their fruit. In this manner dates are sometimes sent, with the branches, as presents to Constantinople. A ripe Egyptian date, although a delicious fruit, is never refreshing to the palate. It suits the Turks, who are fond of sweetmeats of all kinds; and its flavour is not unlike that of the conserved green citron, which is brought from Madeira. The largest plantation occurred about halfway between Alexandria and Aboukir, whence our army marched to attack the French on the 13th of March. The trees here were very lofty; and, from the singular formation of their bark, we found it as easy to ascend to the tops of these trees as to climb the steps of a ladder. Wherever the date tree is found in these dreary deserts, it not only presents a supply of salutary

* The leaves of these trees, when grown to a size for bearing fruit, are six or eight feet long; and may be termed branches, for the trees have no other.

food for men and camels*, but nature has so wonderfully contrived the plant, that its first offering is accessible to man alone; and the mere circumstance of its presence, in all seasons of the year, is a never-failing indication of fresh water near its roots. Botanists describe the trunk of the date tree as full of rugged knots; but the fact is, that it is full of cavities, the vestiges of its decayed leaves, which have within them an horizontal surface, flat and even, exactly adapted to the reception of the human feet and hands; and it is impossible to view them without believing that *He* who, in the beginning, fashioned "Every tree, in the which is the fruit of tree yielding seed, as meat for man," has here manifested one among the innumerable proofs of his beneficent design. The extensive importance of the date tree is one of the most curious subjects to which a traveller can direct his attention. A considerable part of the inhabitants of Egypt, and Arabia, and of Persia, subsist almost entirely upon its fruit. They boast, also, of its medicinal virtues. Their camels feed upon the date-stones; they make couches, baskets, bags, mats, and brushes from the branches; cages for their poultry, and fences for their gardens; from the fibres of the boughs, thread, ropes, and rigging; from the sap is prepared a spirituous liquor; and the trunk of the tree furnishes fuel. It is even said, that from one variety of the palm tree, the Phœnix farinifera meal has been extracted, which is found among the fibres of the trunk, and has been used for food.—Dr. Clarke's *Travels through Europe, Asia, and Africa.*

THE GREAT AMERICAN ALOE.

The American Aloe, is a most curious and remarkable plant; it has very thick leaves, broad towards the root, and tapering to a point, stiff, and prickly, and yielding a kind of cotton, of which laces may be made. From the midst of the leaves rises a stem, which bears the flowers and fruit. The flowers grow at the end of the branches that shoot out opposite to each other; and each consists

* The Arabs feed their camels with the date-stones, after grinding them in their hand-mills.

but of one leaf, cut into six segments at the top, like a hyacinth. The fruit is oblong and cylindrical, divided into three cells, in which are contained flat, and, for the most part, semicircular seeds. Most of the African sorts produce flowers with us annually, when grown to a sufficient size; but the American aloe, which most commonly produces its flower stem immediately from the centre of the plant, seldom flowers till it be of great age, and this but once during the life of the plant, so that to have one flower in England is reckoned a curiosity, and generally draws a vast number of spectators. It is observed, that when the flower-stem, which is usually large, and grows to a great height, begins to shoot from the middle of the plant, it draws all the nourishment from the leaves; so that, as the stem advances, the leaves decay; and when the flowers are full blown, scarcely any of the leaves remain alive; but, whenever this happens, the old root sends forth numerous off-sets; and it is only at this time that some of these aloes can be propagated.

Dr. Morret tells us, that he had an American aloe, consisting of eleven leaves, which was tied about with a red dry cloth, and hung up without oil, in his kitchen. In a whole year he observed it lost two ounces, three drachms, and twenty-four grains of its weight. The next year being drier, and hotter, it lost upwards of three ounces; and more than double in the six colder than in the six hotter months. He kept it about five years, and it wasted much in the same proportion, till at last, hanging it in a cold garret, it died. Our author observed, that every year, two of the greater leaves first changed colour and withered, and every spring there succeeded two fresh and green ones, of the size of the preceding; from whence he thinks it may be probably inferred, that there is a circulation of the nutritious juice in this plant, for how is it possible that the roots, continuing firm and solid as at first, should supply so much nourishment—unless the said juice returned from the old decayed leaves into the root, and so produced new ones.—SMITH'S *Wonders*.

THE BRITISH OAK.

Among the traditions of this wonderful tree, the following, we trust, will prove highly acceptable to our readers.

The large Golenos Oak, which was felled in the year 1810, for the use of his majesty's navy, grew about four miles from the town of Newport, in Monmouthshire; the main trunk, at ten feet long, produced 450 cubic feet; one limb 355, one ditto 472, one ditto, 235, one ditto 156, one ditto 106, one ditto 113, and six other limbs, of inferior size, averaged 93 feet—each making the whole number 2,426 cubic feet, of sound and convertible timber. The bark was estimated at six tons; but as some of the heavy body bark was stolen out of the barge at Newport, the exact weight is not known. Five men were twenty days stripping and cutting down this tree; and a pair of sawyers were five months converting it, without losing a day (Sundays excepted). The money paid for converting only, independent of the expense of carriage, was 82*l.*, and the whole produce of the tree, when brought to market, was within a trifle of 600*l.* It was bought standing for 405*l.*; the main trunk was nine feet and a half in diameter, and, in sawing it through, a stone was discovered, six feet from the ground, above a yard in the body of the tree, through which the saw cut; the stone was about six inches in diameter, and completely shut in, but round which there was not the least symptom of decay. The rings in its butt were carefully reckoned, and amounted to above 400 in number, a convincing proof that this tree was in an improving state for upwards of 400 years; and, as the ends of some of its branches were decayed, and had dropped off, it is presumed it had stood a great number of years after it had attained maturity.—*Time's Telescope*, vol. iii.

REMARKABLE FLOWERS.

PASSIFLORA CŒRULEA, *or* Common Blue Passion Flower.

All the *Passifloras* claim the admiring eye, nor is this, though the most common, as thriving well out of doors, the least attractive. It was discovered in the Brazils, and its wonders were soon proclaimed to Christian kingdoms, as representing the passion of our Lord, whence its present appellation. The leaves were said exactly to resemble the spear that pierced our Saviour's side; the tendrils, the cords that bound his hands, or the whips that scourged him; the ten petals, the Apostles, Judas having betrayed, and Peter deserted him; the pillar in the centre, was the cross or tree; the stamina, the hammers; the styles, the nails; the inner circle, about the central pillar, the crown of thorns; the radiance, the glory; the white, in the flower, the emblem of purity; and the blue, the type of heaven. On one of the species, the Passiflora Alata, even drops of blood are to be seen upon the cross or tree. The flower keeps open three days, and then disappears, denoting the resurrection. At last this sacred flower was brought from the Brazils to Europe, and became a denizen of our gardens in the year 1699.

The Alata Passion-flower, from South America, is reckoned by far to surpass all its kindred, both as to the elegance and brilliancy of its appearance, and exhibits to a fervent imagination the same fancy of a crucifix; and here we might add, that the column in the centre is spotted, as if stained with blood.—Dr. Thornton.

The following lines on this beautiful flower, are from the pen of Dr. Shaw:

Beneath the covert of o'er-arching trees,
Bright Murucuia* woos the cooling breeze
The passing Indian turns the admiring eye,
Smit by the glories of her crimson dye,

* Murucuia, the ancient American name of this plant.

And stops, in pleas'd attention, to survey
Her vivid leaves and variegated ray.
But loftier thoughts the rising mind inspire,
When warm devotion lends her holy fire.
Haply amid the convent's virgin train,
Bosom'd in shades beyond the western main,
At rosy morn, or evening's silent hour,
Some fair enthusiast views the sainted flower:
When lo! to rapt imagination's eye,
Springs the sad scene of darken'd Calvary!
The thorny crown the heavenly brows around,
The scourging thorns, the galling cords that bound,
And nails that pierc'd with agonizing wound.
Sudden she lifts to heaven her ardent eye
In silent gaze and solemn ecstasy;
Then, filled with timid hope and holy fear,
Drops on the flower a consecrated tear.

NYMPHÆA NELUMBO, *or* SACRED EGYPTIAN BEAN.

IN hot climates, where water is the best boon of Heaven, flourish the several kinds of Nymphæas. These present the purest colours, and are of an azure blue, blushing red, or pale yellow, the three primary colours, and also of a dazzling white, all which majestically (different from our humble aquatics,) rise with their foliage above the surface of the flood, and present their luxuriant leaves to the vaulted heavens. Nature, as if designing these plants to be the master-piece of her creative power, besides superior grace and beauty, has also added utility; for the seed vessels contain nourishing food for man, and the roots produce a profitable potato. As the Egyptians worshipped whatever was useful, they accounted those plants sacred; in their feasts they crowned themselves with the flowers, and their altars were decorated with the same. The Egyptian Ceres has the seed vessel of the blue lotus in her hand, which the Romans corrupted into the poppy, and sometimes also that of the nelumbo, which the Greeks mistook for the horn of Amalthea.—DR. THORNTON.

PROTEA CYNAROIDES, *or* Artichoke Silver-tree.

This shrub is one of the most beautiful plants which are to be found at the Cape of Good Hope, a country so extremely rich in vegetable productions. It has the generic appellation Protea, in allusion to Proteus, son of the Ocean and Thetis, as he could assume all forms; and this tribe is not less distinguished by the variety of shapes, in which it appears, than for possessing a leaf, which, in some species, has a glossy hue like silver, varying in different lights, which it the more readily effects by the waving of its foliage. It may have the name of Proteus also from the variety in the flowers of sixty different species of this genus. In this species the stem is perfectly erect, and without branches, and at different distances all around proceed channelled peduncles, which seem to form a part of each leaf, which is spreading, ovate, and possesses a wave, that gives a singularity and beauty to the whole plant. The flower, as the specific name expresses, has the appearance of an artichoke, but it is a perfect cone with the apex downwards, and its imbricated scales below are of a greenish cast, whereas the leaves above are of a most delicate texture, having the rich colouring of petals, being of a fine red, and in several rows. Within this cone, or common calyx, are situated the numerous florets, which are small and slender; the corolla is of a purple colour, and cut into four thin segments, and contains the filaments supporting four anthers, which projecting from the florets, and placed in circular order, and being incumbent towards the centre, give a very extraordinary appearance to the whole flower.—Dr. Thornton.

SARRACENIA FLAVA, *or* Yellow Pitcher-Plant.

This plant, so singular for its leaves and flowers, is a native of Virginia, and grows in bogs, or shallow water. It was introduced into our gardens in the year 1752. The leaves in their infant state are flat, tapering, and of one compact substance; but at a certain age, at the top, the appearance of a lid is seen, bent down, or rather then resembling the upper bill of a bird: afterwards the leaf opens

from within, until it enlarges itself into a triangular hollow vase, when the lid turns back, taking the form of a friar's cowl. This contains water, and in droughts, it is said, that the lid falls down over the mouth of the tube, serving as a covering to it, to prevent the exhalation. It is called the pitcher-plant, because small birds repair to it, and drink out of the hollow leaf.—Dr. Thornton.

ARUM DRACUNCULUS, *or* Dragon Arum.

This extremely fetid poisonous plant, is thus personified by Dr. Thornton.

She comes peeping from her purple crest, with mischief fraught: from her green covert projects a horrid spear of darkest jet, which she brandishes aloft; issuing from her nostrils flies a noisome vapour, infecting the ambient air. Her hundred arms are interspersed with white, as in the garments of the Inquisition; and in her swollen trunk, are observed the speckles of a mighty dragon; her sex is strongly intermingled with the opposite! confusion dire! all framed for horror, or kindly to warn the traveller that her fruits are poison-berries, grateful to the sight, but fatal to the taste; such is the plan of Providence, and such her wise resolves.

Thy soul's first hope! thy mother's sweetest joy!
Cried tender Laura, as she kissed her boy.
Oh! wander not where Dragon Arum show'rs
Her baleful dews, and twines her purple flow'rs.
Lest round thy neck she throw her snaring arms,
Sap thy life's blood, and riot on thy charms.
Her shining berry, as the ruby bright,
Might please thy taste, and tempt thy eager sight.
Trust not this specious veil; beneath its guise,
In honey'd streams, a fatal poison lies.

So vice allures with virtue's pleasing song,
And charms her victims with a Siren s tongue.

Frances A. Rowden

CACTUS GRANDIFLORUS, *or* NIGHT-BLOWING CEREUS.

THIS plant is called by Linnæus Large-flowering Cactus, on account of the comparative largeness of its flower, which, in its native country, Jamaica, is often more than a foot in diameter. It has the appellation also of Night-blowing Cereus, from its opening its beautiful flowers after sun-set. Others have styled it the Torch Thistle, from the armature about its pentangular, articulated, and climbing stem, which is leafless, succulent, and exhibits to the observer a figure equally grotesque as terrific, with flowers possessing actually the blazing appearance of a torch. I have sometimes seen, observes the writer, in our hot-houses, twenty or thirty of these flowers expanded in the same evening, emitting all the while a fine balsamic odour. This beautiful flower begins to open about seven or eight o'clock in the evening, and closes before sun-rise in the morning.

STAPELIA, *or* POISON-PLANT.

DISPERSED over the arid wilds of Africa, in pyramidical forms, issue the fleshy stems, destitute of leaves, of the several Stapelias. These stems are on every side armed with hooks like claws. The juices of this plant are so acrid, that the smart they occasion on the tongue will be sensible a long time, and even fatal, if tasted beyond a certain proportion. Nature has well marked it of the natural order, the lurid, or poisonous, for the corolla, which is deeply cleft into five segments, is of a dusky purple, and dingy yellow, and speckled like the belly of a serpent, besides being fringed with hairs, which give to this flower something of an animal appearance. It has likewise so strong a scent, resembling carrion, that blow-flies in abundance hover round it, and mistaking the corolla for flesh, deposit there their eggs, which are soon converted into real maggots, adding to the horror of the scene, some being seen writhing among the purple hairs of the flower, and others already dead for want of food—the vegetable

in this rare instance, deceiving and overcoming the animal creation.—Dr. Thornton.

MIMOSA GRANDIFLORA, *or* Large-Flowering Sensitive Plant.

This most elegant shrub is a native of the East Indies. It was first introduced into our gardens in 1769, by Mr. Norman. It is found frequent in mountainous districts. It sleeps at regular periods, by closing its two corresponding leaflets together; and the flowers are so rapid in their growth, as to give them also the appearance of spontaneous motion, nature having well dissembled in this tribe of vegetables the high attributes of sensation and of action. Growing to the size of a moderate tree, it is not armed with spines, as many of its congeners; nor does it possess, like the Mimosa Pudica (the common Sensitive Plant), the power of retracting its branches, so as to set the whole plant into general motion upon the rude approach of an invader. Secreting honey, it gives a delightful food to the humming bird. Dr. Darwin thus describes this beautiful plant:

Fill'd with nice sense the chaste Mimosa stands,
From each rude touch withdraws her timid hands:
Oft, as light clouds o'erpass the summer glade,
Alarm'd she trembles at the moving shade;
And feels, alive through all her tender form,
The whisper'd murmurs of the gathering storm;
Shuts her sweet eyelids to approaching night,
And hails with freshen'd charms the rising light.

DIONÆA MUSCIPULA, *or* Venus's Fly-Trap.

The American plant called Dionæa Muscipula, or Venus's Fly-trap, affords a remarkable instance of rapid vegetable motion. Its leaves are jointed, and furnished with two rows of strong prickles. Their surfaces are covered with a number of minute glands, which secrete a sweet liquor, and allure the approach of flies. When

these parts are touched by the legs of a fly, the two lobes of the leaf instantly rise up, the rows of prickles lock themselves fast together, and squeeze the unwary animal to death. If a straw or pin be introduced between the lobes, the same motions are excited. Dr. Darwin says, that the sweet viscous liquor just mentioned, is a curious contrivance of Nature, to prevent various insects from plundering the honey, or devouring the seed, and he thus poetically describes the plant, and this its remarkable peculiarity:

The fell Silene and her sisters fair,
Skill'd in destruction, spread the viscous snare,
The harlot-band ten lofty bravoes screen,
And frowning guard the magic nets unseen.
Haste, glittering nations, tenants of the air,
Oh, steer from hence your viewless course afar!
If with soft words, sweet blushes, nods, and smiles,
The three dread sirens * lure you to their toils,
Lim'd by their art in vain you point your stings,
In vain the effort of your whirring wings!
Go, seek your gilded mates and infant hives,
Nor taste the honey purchased with your lives.

Contemplative Philosopher.

VALLISNERIA SPIRALIS, *or* WATER PLANT.

THIS extraordinary plant is found in the East Indies, in Norway, and various parts of Italy. They have their roots at the bottom of the Rhone; the flowers of the female plant float on the surface of the water, and are furnished with an elastic spiral stalk, which extends or contracts as the water rises and falls; this rise or fall, from the rapid descent of the river, and the mountain torrents which flow into it, often amounts to many feet in a few hours. The flowers of the male plant are produced under water, and as soon as their farina, or dust, is mature, they detach themselves from the plant, and rise to the surface, continue to flourish, and are wafted by the air, or borne by the cur-

* Three females and ten males inhabit each flower.

rent, to the female flowers. In this, resembling those tribes of insects where the males at certain seasons acquire wings, but not the females, as ants and several other insects. These male flowers are in such numbers, though very minute, as frequently to cover the surface of the river to a considerable extent.—DARWIN'S *Botanic Garden.*

THE BOX-EVERGREEN SHRUB.

THIS native of the north preserves its verdure during the most severe winters. It is not now the fashion, but was some years ago the ornament of our gardens. The ancients held the box-tree in great estimation, as it is susceptible of being cut into various forms.

In the entertaining letters of the younger Pliny, we read, that at his country-seat, there were box-trees cut into the form of men on horseback, a huntsman preceded by his hounds, various quadrupeds, elegant vases, *&c.*

There was in this great man's garden, a box-tree of vast dimensions, cut into different apartments, in the centre was a verdant saloon, enlivened by the warbling of birds; in it was introduced a water-fall, which rushed into a small basin, bordered with moss. This charming retreat was decorated with a bench of white marble all round.

REMARKABLE FROSTS, *&c.*

GREAT FROST OF 1813 AND 1814.

THE great fog which preceded this remarkable frost, commenced, in London, on the evening of the 29th of December, 1813, about two hours before Lord Castlereagh set out from London on his way to embark for the Continent. Happily his lordship proceeded on his journey without interruption; it was not so with the Prince Regent, who, intending to pay a visit to the Marquis of

Salisbury, at Hatfield-House, was obliged to return back to Carlton-House, after one of his out-riders had fallen into a ditch on this side of Kentish-Town, and which short excursion occupied several hours. Mr. Croker, of the Admiralty, also wishing to proceed on a visit northward, wandered in the dark for several hours, without making more than three or four miles' progress.

This tremendous fog, or "darkness that might be *felt!*" continued till the 3d of January. On most of the roads, excepting the high north road, travelling was performed with the utmost danger, and the progress of the mails was greatly impeded. On Wednesday, the 29th of December, the Birmingham mail was nearly seven hours in going from the Post-Office to a mile or two below Uxbridge, a distance of twenty miles only. On this, and the other evenings, the short stages in the neighbourhood of London had two persons with links running by the horses' heads; nevertheless, with this and other precautions some serious and many whimsical accidents occurred. Pedestrians even carried links or lanterns, and many who were not provided with those illuminators, lost themselves in the most frequented, and, at other times, well-known, streets. Hackney coachmen mistook the pathway for the road, and *vice versâ*, the greatest confusion occurring.

On the 31st of December, the state of the metropolis, in consequence of the increased fog, was at night truly alarming. It required great attention and knowledge of the public streets to proceed any distance, and those persons who had any material business to transact, were unavoidably compelled to carry torches. The usual lamps appeared through the haze no bigger than small candles. The most careful hackney-coachmen got off the box and led their horses, while others drove only at a walking pace. There were frequent meetings of carriages, and great mischief ensued. Among the passengers much caution and apprehension prevailed. Many, alarmed at the idea of being run down, made exclamations, such as "Who is coming?" "Mind!" "Take care!" *&c.* Females who had ventured abroad before the fog came on, were placed under great peril; several missed their way. Such was the extreme density of the atmosphere, on

Tuesday evening, the 28th, that the Maidenhead coach on its return from town, missed the road near Harford-Bridge, and was overturned. Lord Hawarden was among the passengers, and received an injury by the accident.

Almost immediately on the cessation of the fogs, heavy falls of snow took place. There is nothing in the memory of man to equal those falls. After several shorter intervals, the snow continued incessantly for 48 hours, and this, too, after the ground was covered with a condensation, the result of nearly four weeks' frost. Almost the whole of the time the wind blew continually from the North and North-East, and was intensely cold. A short thaw also, which scarcely lasted one day, only rendered the state of the streets so much the worse. Hence the mass of snow and water became so thick, that it was with difficulty that hackney-coaches, with an additional horse, and other vehicles, could plough their way through. Almost all kinds of trades and callings, carried on in the streets, stopped, which considerably increased the distress of the lower orders. Few carriages, even stages, could travel on the roads, which, even about town, seemed deserted. From many buildings icicles, full a yard and a half long, were seen suspended. The house-water-pipes were all frozen, whence it became necessary to have plugs in the streets for the supply of all ranks of people. The Thames, from London Bridge to Blackfriars, was, for nearly a fortnight, completely blocked up at ebb tide.

All the ponds and rivers in the neighbourhood of London were completely frozen, and skating was pursued with great avidity on the Canal in St. James's, and the Serpentine in Hyde-Park. On Monday, the 10th of January, the Canal and the Basin in the Green-Park were conspicuous for the number of *steel-shod* heroes who covered their glassy surfaces, and who, according to their respective qualities, administered to the pleasure of the throng which crowded their banks; some, by the agility and grace with which they performed their evolutions, and others by the tumbles and other accidents which marked their clumsy career. There was, as usual, a motley collection of all orders of his Majesty's subjects, engaged in the busy scene, who seemed all alike eager candidates for the applause of the multitude: and sweep, dustman, drummer,

or beau, each seemed conscious of possessing some claim, not only to his own good opinion, but to that of the fair *belles* who viewed his movements. There were several accidents in the course of the day, but none we believe of a serious nature.

While these parks were thus numerously attended, Hyde-Park had to boast of a more distinguished order of visitors, who, in the course of the afternoon, flocked in prodigious crowds to the banks of the Serpentine, which was covered with most excellent ice. Notwithstanding the keenness of the breeze, several females of dash, clad in robes of the richest fur, bid defiance to its chilling embrace, and on the fragile bosom of the river ventured their fair frames. The skaters were in great numbers, and were of first-rate note. Some of the most difficult movements of the art were executed with an agility and grace which excited universal admiration.

A lady and two officers performed a reel with a precision scarcely conceivable, and attracted a very numerous circle of spectators, whose boisterous applause so completely terrified the fair cause of their ecstasy, as to induce her to forego the pleasure she herself received from the amusement, and to put an end to that which she afforded to such as were disposed to admire her in silence.

Two unfortunate accidents occurred; one skating lady dislocated the *patella* or kneepan, and five gentlemen and a lady were immersed in the icy fluid, but received no farther injury than a severe ducking.

On the 20th of January, in consequence of the great accumulation of snow heaped upon the ground, it became necessary to relieve the roofs of the houses by throwing off the load collected on them; and by these means the carriage-ways in the middle of the streets were rendered scarcely passable for man or horse; and all the inconveniences described in page 116, were the consequence. The streams constantly flowing from the open plugs, added to the general mass of ice. An enormous increase took place in the price of coals, as the river-navigation and other means of conveyance were entirely obstructed.

The continuation of the frost and snow induced many coach-proprietors, particularly on the northern and western roads, not to continue running their coaches until a change

of weather should take place. In many places where the roads lie low, the snow had drifted higher than the coaches, which was the case as near town as Finchley Common. The snow had drifted into the road in the course of one night, a depth of sixteen feet, and it was impassable at first even to oxen. On Bagshot-Heath there was a complete stoppage, and accidents occurred by vehicles getting off the road. About Esher and Cobham again the road was completely choaked up.

With the exception of the Kent and Essex roads no others were passable but a few miles out of London. The coaches on the western road remained stationary at different parts. The Windsor coach got through the snow at Colnbrook, which was sixteen feet deep, by employing about fifty labourers. Lower down, at Maidenhead-lane, the snow drifted to a great depth; and between Twyford and Reading it assumed quite a mountainous appearance. On parts of Bagshot-Heath, it is impossible to convey an adequate idea of its situation. The Newcastle coach went off the road into a pit upwards of eight feet deep, but without doing mischief to either man or horse. The middle North road was impassable as near as Highgate hill.

On the 22d of January, and for some days afterwards, the ice on the Serpentine exhibited a singular appearance, from the mountains of snow which the sweepers had collected together in different situations. The spaces allotted for the skaters were in the forms of circles, squares, and oblongs. Next to the carriage ride, (on the north side,) were many astonishing evolutions displayed. Skipping on skates, and the Turk-cap backwards, were among the most conspicuous. A sledge was drawn by a pony, rough shod. The ice was not good, it being injured by the partial thaw in some places, and in others much cut up. It was highly amusing to see the most elegantly dressed females dashing through the hillocks of snow.

Among the extraordinary aspects and appearances of the late severe weather, the state of the river Thames was not the least singular. Vast quantities of pieces of floating ice, loaden generally with heaps of snow, were seen almost every where on the surface; and being carried up and down by the tide or the stream, and collected when

the projecting banks or the bridges made a resistance to the flow, and a support to the accumulation—sometimes forming a chain of glaciers, united one moment, at another clashing and cracking and dashing in a singular and awful manner; again, when the flood beneath was not sufficiently elevated to support the mass, and when the current passed strongly, the ice islands floated away, clashing and cracking as they went, rising one over another, and then receding, covered with angry foam, as the violence of the wind or wave impelled them.

In passing through the arches of the bridges the crash was tremendous; for, near the bridges, the floating pieces collected about midwater, or while the current was less forcible, and ranged themselves regularly one line upon another, the stream forming them into order as it passed, where it made its way in force, till the increasing confinement of the channel added such violence to the conflict, that a disruption took place, and the broken ice, with a crash, burst away again, and was carried up or down with the tide or the stream. The river was entirely frozen over for the space of a week, and a complete *frost fair* held upon it.

We shall now confine ourselves to the events which took place on the marble bosom of the now-flowing Thames, from the 30th of January to the 7th of February, inclusive.

Sunday, January 30th.—Immense masses of ice, that had floated from the upper parts of the river, in consequence of the thaw of the two preceding days, now blocked up the Thames between Blackfriars and London bridges, and afforded every probability of its being frozen over in a day or two. Some venturous persons even now walked on different parts of the ice.

Monday, January 31st.—This expectation was realized. During the whole of the afternoon, hundreds of people were assembled on Blackfriars and London bridges, to see several adventurous men cross and re-cross the Thames on the ice. At one time seventy persons were counted, walking from Queenhithe to the opposite shore. The frost on Sunday night so united the vast mass, as to render it immoveable by the tide.

Tuesday, February 1st.—The floating masses of ice,

with which we have already stated the Thames to be covered, having been stopped by London Bridge, now assumed the shape of a solid surface over that part of the river which extends from Blackfriars Bridge to some distance below Three-Crane-Stairs, at the bottom of Queen-Street, Cheapside. The watermen, taking advantage of this circumstance, placed notices at the end of all the streets of the city leading to the river, announcing a safe foot-way over the river, which, as might be expected, attracted immense crowds to witness so novel a scene. Many were induced to venture on the ice, and the example thus afforded soon led thousands to perambulate the rugged plain, where a variety of amusements were prepared for their entertainment.

Among the more curious of these was the ceremony of roasting a small sheep, which was *toasted*, or rather burnt, over a coal fire, placed in a large iron pan. For a view of this extraordinary spectacle sixpence was demanded, and willingly paid. The delicate meat, when done, was sold at a shilling a slice, and termed *Lapland mutton*. Of booths there were a great number, which were ornamented with streamers, flags, and signs, and in which there was a plentiful store of those favourite luxuries, *gin*, *beer*, and *gingerbread*.

Opposite Three-Crane-Stairs there was a complete and well-frequented thoroughfare to Bankside, which was strewed with ashes, and apparently afforded a very safe, although a very rough path. Near Blackfriars Bridge, however, the path did not appear to be equally safe; for one young man, a plumber, named Davis, having imprudently ventured to cross with some lead in his hands; he sank between two masses of ice to rise no more. Two young women nearly shared a similar fate, but were happily rescued from their perilous situation by the prompt efforts of two watermen. Many a fair nymph, indeed, was embraced in the *icy arms* of old father Thames. Three prim young quakeresses had a sort of semi-bathing near London Bridge, and, when landed on *terra firma*, made the best of their way through the Borough, amidst the shouts of an admiring populace, to their residence at Newington.

In consequence of the impediments to the current of the

river at London Bridge, the tide did not ebb for some days more than one half the usual mark.

Wednesday, February 2nd.—The same sports were repeated, and the Thames presented a complete Frost Fair. The grand mall, or walk, was from Blackfriars Bridge to London Bridge; this was named the City Road, and lined on each side with tradesmen of all descriptions. Eight or ten printing presses were erected, and numerous pieces, commemorative of the great frost, were *actually printed* on the ice. Some of these frosty typographers displayed considerable taste in their specimens. At one of the presses an orange-coloured standard was hoisted with the watch-word Orange Boven in large characters, and the following papers were issued from it:

FROST FAIR.

Amidst the arts which on the Thames appear,
To tell the wonders of this icy year,
Printing claims prior place, which, at one view,
Erects a monument of *that* and *you*.

Another.

You that walk here, and do design to tell
Your children's children what this year befell;
Come buy this print, and it will then be seen,
That such a year as this has seldom been.

Another of these *stainers of paper* addressed the spectators in the following terms:

"Friends, now is your time to support the freedom of the press. Can the press have greater liberty? Here you find it working in the middle of the Thames; and if you encourage us by buying our impressions, we will keep it going in the true spirit of liberty during the frost."

One of the articles printed and sold contained the following lines:

Behold, the river Thames is frozen o'er,
Which lately ships of mighty burden bore;
Now different arts and pastimes here you see,
But printing claims the superiority.

Besides the above, the Lord's Prayer and several other pieces were issued from the icy printing offices, and which were bought with the greatest avidity.

Thursday, February 3rd.—The adventurers were still more numerous. Swings, book-stalls, dancing in a barge, suttling-booths, playing at skittles, and almost every appendage of a fair on land, was now transferred to the Thames. Thousands of people flocked to behold this singular spectacle, and to partake of the various sports and pastimes. The view of St. Paul's, and of the city, with the white fore-ground, had a very singular effect: in many parts mountains of ice were upheaved, and these fragments bore a strong resemblance to the rude interior of a stone quarry.

Friday, February 4th.—Every day brought a fresh accession of pedlars, to sell their wares; and the greatest rubbish of all sorts were raked up, and sold at double and treble the original cost. Books and toys, labelled "Bought on the Thames," were seen in profusion. The watermen profited exceedingly; for each person paid a toll of twopence or threepence before he was admitted to Frost Fair; some douceur, also, was expected on your return. These men are said to have taken 6*l*. each in the course of a day.

This afternoon, about five o'clock, three persons, an old man and two lads, having ventured on a piece of ice above London Bridge, it suddenly detached itself from the main body, and was carried by the tide through one of the arches. The persons on the ice, who laid themselves down for safety, were observed by the boatmen at Billingsgate, who, with laudable activity, put off to their assistance, and rescued them from their impending danger. One of them was able to walk, but the other two were carried, in a state of insensibility, to a public-house, where they received every attention their situation required.

Many persons were seen on the ice till late at night, and the effect by moonlight was singularly picturesque and beautiful. With a little stretch of imagination we might have transported ourselves to the frozen climes of the north,—to Lapland, Sweden, or Holland.

Saturday, February 5th.—The morning of this day augured rather unfavourably for the continuance of Frost

Fair. The wind had shifted to the south, and a light fall of snow took place. The visitors of the Thames, however, were not to be deterred by trifles. Thousands again ventured, and there was still much life and bustle on the frozen element.

The foot-path in the centre of the river was hard and secure, and among the pedestrians we observed four donkeys, which trotted a nimble pace, and produced considerable merriment. At every glance the spectator met with some pleasing novelty. Gaming, in all its branches, threw out different allurements, while honesty was out of the question. Many of the itinerant admirers of the profits gained by E O tables, rouge-et-noir, te-totum, wheel of fortune, the garter, &c., were industrious in their avocations, leaving their kind customers without a penny to pay the passage over a plank to the shore. Skittles was played by several parties; and the drinking tents, filled by females and their companions, dancing reels to the sound of fiddles, while others sat round large fires, drinking rum, grog, and other spirits. Tea, coffee, and eatables, were provided in ample order, while the passengers were invited to eat by way of recording their visit. Several respectable tradesmen also attended with their wares, selling books, toys, and trinkets, of every description.

Towards the evening the concourse became thinned; rain fell in some quantity. *Maister Ice* gave some loud cracks, and floated with the printing presses, booths, &c., to the no small dismay of publicans, typographers, &c. In short, this icy palace of Momus, this fairy frost work, was soon to be dissolved, and was doomed to vanish, "like the baseless fabric of a vision," but leaving *some wrecks* behind.—*Frostiana.*

SNOW.

Why hover snows, and wanton in the air,
Fall by degrees, and clothe the hoary year?—BROOME.

He gives the winter's snow her airy birth,
And bids her virgin fleeces clothe the earth.—SANDYS.

AMONG the various phenomena, not one is more worthy of discussion than that of snow, which is confessedly one

of the most curious productions of nature, and, in the remotest ages of antiquity, has excited the admiration of the poets and philosophers, whether sacred or profane. The author of the book of Job, in the discourse which he puts into the mouth of Elihu, concerning the glorious and incomprehensible works of the Deity, thus expresses himself: "God thundereth marvellously with his voice: great things doeth he, which we cannot comprehend; for he saith to the snow, Be thou on the earth." And he represents the Omnipotent Jehovah, in his sublime expostulation with the patriarch, thus demanding: "Hast thou entered into the treasures of the snow, or hast thou seen the treasures of the hail, which I have reserved against the time of trouble, against the day of battle and war?" "He giveth (says the Psalmist) snow like wool: he scattereth the hoar-frost like ashes. He casteth forth his ice like morsels: who can stand against his cold?" "At his commandment (says the wise son of Sirach) he maketh the snow to fall apace. As birds flying he scattereth the snow, and the falling down thereof is as the lighting of grasshoppers. The eye marvelleth at the beauty of the whiteness thereof, and the heart is astonished at the raining of it."

Homer, the venerable sire of bards, has described a shower of snow, and its extensive effects, in a noble strain of poetry:

In winter's bleak uncomfortable reign,
A snowy inundation hides the plain;
Jove stills the winds, and bids the skies to sleep;
Then pours the silent tempest thick and deep:
And first the mountain tops are covered o'er,
Then the green fields, and then the sandy shore;
Bent with the weight the nodding woods are seen,
And one bright waste hides all the works of men:
The circling seas alone, absorbing all,
Drink the dissolving fleeces as they fall.

With respect to the philosophical account of this well-known meteor, naturalists are agreed, that it is formed by the freezing of the vapours in the atmosphere. The snow we receive may, properly enough, be ascribed to the old ness of the atmosphere through which it falls. When the atmosphere is warm enough to dissolve the snow before it

arrives to us, we call it rain; if it preserve itself undissolved, it makes what we call snow. It differs from the particles of hoar-frost, in being crystallized, as it were, which they are not. This appears on the examination of a flake of snow by a magnifying glass; when the whole of it will seem composed of fine shining spicula, or points, diverging like rays from a centre. As the flakes fall down through the atmosphere, they are continually joined by more of these radiated spicula, and thus increase in bulk like the drops of rain or hail-stones. Dr. Grew, in a discourse on the nature of snow, observes, that many parts of it are of a regular figure, for the most part so many little rowels or stars of six points, and are as perfect and transparent ice as any we see on a pond. Upon each of these points are other collateral points, set at the same angles as the main points themselves: among which there are divers others irregular, which are chiefly broken points, and fragments of the regular ones. Others also by various winds seem to have been thawed, and frozen again into irregular clusters; so that it seems as if the whole body of snow was an infinite mass of icicles irregularly figured. That is, a cloud of vapours being gathered into drops, those drops forthwith descend, and, in their descent, meeting with a freezing air as they pass through a colder region, each drop is immediately frozen into an icicle, shooting itself forth into several points; but these, still continuing their descent, and meeting with some intermitting gales of warmer air, or, in their continual waftage to and fro, touching upon each other, are a little thawed, blunted, and frozen into clusters, or entangled so as to fall down in what we call flakes.

According to Signore Beccaria, clouds of snow differ in nothing from clouds of rain, but in the circumstance of cold that freezes them. Both the regular diffusion of snow, and the irregularity of the structure of its parts (particularly some figures of snow or hail, which he calls *rosette*, and which fall about Turin), show the clouds of snow to be acted upon by some uniform cause, like electricity. He even endeavours, very particularly, to show in what manner certain configurations of snow are made by the uniform action of electricity. He was confirmed in his reasonings on this subject by observing, that his ap-

paratus never failed to be electrified by snow as well as by rain; and, he adds, that a more intense electricity unites the particles of hail more closely than the more moderate electricity does those of snow.

Snow, although it appears to be soft, is really hard, because it is true ice. It seems soft, because, at the first touch of the finger upon its sharp edges or points, they melt; otherwise they would pierce the finger like so many lancets.

Dr. E. D. Clarke, in his *Travels*, (vol. i. p. 11,) records a very curious and beautiful phenomenon, which he witnessed before the breaking up of the winter season at St. Petersburg: Snow, in the most regular and beautiful crystals, fell gently on our clothes, and on the sledge, as we were driving in the streets: all of them possessed exactly the same figure, and the same dimension. Every particle consisted of a wheel or star, with six equal rays bounded by circumferences of equal diameters: they had all of them the same number of rays branching from a common centre. The size of each of these little stars was equal to the circle presented by dividing a pea into two equal parts. This appearance continued during three hours, in which time no other snow fell, and there was sufficient leisure to examine them with the strictest attention. As water, in its crystallization (continues Dr. Clarke), seems to consist of radii diverging from a common centre, by the usual appearances on the surfaces of the ice, it might be possible to obtain the theory and ascertain the laws from which this stellar structure results. Monge, president of the French Institute, noticed, in falling snow, stars with six equal rays, which fell during winter, when the atmosphere was calm. This is also recorded by Haüy. Dr. Clarke has accompanied this description with three wood-cuts, to which we refer the curious reader.

The lightness of snow, although it is firm ice, is owing to the excess of its surface, in comparison to the matter contained under it; and thus gold, the most ponderous of all bodies, when beaten into leaves, will ride upon the least breath of air. The whiteness of snow is owing to the small particles into which it is divided; for ice, when pounded will become equally white. An artificial snow has been made by the following experiment: A tall phial

of aquafortis being placed by the fire till it is warm, and filings of pure silver, a few at a time, being put into it, after a brisk ebullition, the silver will dissolve slowly. The phial then being placed in a cold window, as it cools, the silver particles will shoot into crystals, several of which running together will form a flake resembling snow, and descend to the bottom of the phial. While these are descending, they represent perfectly a shower of silver snow, and the flakes will lie upon one another at the bottom, like real snow upon the ground. In a word, a shower of snow, although so common with us, and therefore so little regarded, is, in itself, a most beautiful spectacle, and is considered by the natives of southern climes, on their arrival here, as the most extraordinary and amazing phenomenon of nature.—*Contemplative Philosopher.*

ICE.

The blasted groves their verdant pride resign,
And waters hardened into crystals shine;
Ev'n the proud seas forget in tides to roll,
Beneath the freezing of the northern pole;
Their waves on waves in solid mountains rise,
And alps of ice invade the wond'ring skies.—BROOME.

ICE is a brittle transparent body, formed of some fluid, frozen or fixed by cold. The specific gravity of ice to water is various, according to the nature and circumstances of the water, degree of cold, *&c.*

The rarefaction of ice is supposed to be owing to the air-bubbles produced in it while freezing: these, being considerably large in proportion to the water frozen, render the ice so much specifically lighter. It is well known that a considerable quantity of air is lodged in the interstices of water, though it has there little or no elastic property, on account of the disunion of its particles; but upon these particles coming closer together, and uniting as the water freezes, light, expansive, and elastic air-bubbles are thus generated, increase in bulk as the cold grows stronger, and, by their elastic force, burst to pieces any vessel in which the water is closely contained. But snow-water, or any water long boiled over the fire,

affords an ice more solid, and with fewer bubbles. Pure water long kept in vacuo, and frozen afterwards there, freezes much sooner, on being exposed to the same degree of cold, than water unpurged of its air and set in the open atmosphere. And the ice made of water thus divested of its air is much harder, more solid and transparent and heavier than common ice.—*Frostiana.*

ICE HILLS.

Ice hills are a sort of structure or contrivance common upon the river Neva, at Petersburg, and which afford a fund of amusement to the populace. They are constructed in the following manner: A scaffolding is raised upon the river about 30 feet in height, with a landing-place on the top, the ascent to which is by a ladder. From this summit a sloping plane of boards, about 4 yards broad and 30 long, descends to the superfices of the river: it is supported by strong poles gradually decreasing in height, and its sides are defended by a parapet of planks. Upon these boards are laid square masses of ice, about 4 inches thick, which, being first smoothed with the axe, and laid close to each other, are then sprinkled with water; by these means they coalesce, and, adhering to the boards, immediately form an inclined plane of pure ice. From the bottom of this plane the snow is cleared away for the length of 200 yards and the breadth of 4, upon the level bed of the river, and the sides of this course, as well as the sides and top of the scaffolding, are ornamented with firs and pines.

Each person, being provided with a sledge, mounts the ladder, and having attained the summit, he seats himself upon his sledge at the upper extremity of the inclined plain, down which he suffers it to glide with considerable rapidity, poising it as he goes down; when the velocity acquired by the descent carries it above 100 yards upon the level ice of the river. At the end of this course, there is usually a similar ice-hill, nearly parallel to the former, which begins where the other ends, so that the person immediately mounts again, and in the same manner glides down the other inclined plane of ice. This diversion he

repeats as often as he pleases. The boys also are continually employed in skating down these hills; they glide chiefly upon one skate, as they are able to poise themselves better upon one leg than upon two. These ice-hills exhibit a pleasing appearance upon the river, as well from the trees with which they are ornamented, as from the moving objects which at particular times of the day are descending without intermission.—*Frostiana.*

ICEBERGS.

Icebergs are large bodies of ice filling the valleys between the high mountains in northern latitudes. Among the most remarkable are those of the East coast of Spitzbergen. They are seven in number, but at considerable distances from each other; Each fills the valleys for tracts unknown, in a region totally inaccessible in the internal parts. The glaciers of Switzerland, (see Glaciers,) seem contemptible to these, but present a similar front into some lower valley. The last exhibits over the sea a front 300 feet high, emulating the emerald in colour; cataracts of melted snow precipitate down various parts, and black spiring mountains, streaked with white, bound the sides, and rise crag above crag, as far as eye can reach in the back-ground. At times immense fragments break off, and tumble into the water with a most alarming dashing. In Phipps's Voyage to the North Pole, we are told, a piece of this vivid green substance has fallen, and grounded in 24 fathoms water, and spired above the surface 50 feet. Similar icebergs are frequent in all the arctic regions, and to their lapses is owing the solid mountainous ice which infests those seas.

Frost sports wonderfully with these icebergs, and gives them majestic as well as other most singular forms. Masses have been seen assuming the shape of a Gothic church, with arched windows and doors, and all the rich drapery of that style, composed of what an Arabian tale would scarcely dare to relate, of crystal of the richest sapphirine blue; tables with one or more feet; and often immense flat-roofed temples, like those of Luxor on the Nile, supported by round transparent columns of cœrulean

hue, float by the astonished spectator. These icebergs are the creation of ages, and receive annually additional height by the falling of snows and of rain, which often instantly freezes, and more than repairs the loss occasioned by the influence of the melting sun.—*Frostiana.*

UNION OF SUGAR AND ICE.

In the winter of 1799, (says M. Acerbi,) I beheld at Stockholm a spectacle of a very uncommon nature, and such as I never, in all probability, shall see a second time. It was a sugar-house on fire in the suburbs, on the South of the city. The accident being announced by the discharge of cannon, all the fire engines were immediately hurried to the aid of the owners. The severity of that winter was so great, that there was not a single spot near where the water was not frozen to the depth of a yard from the surface. It was necessary to break the ice with hatchets and hammers, and to draw up the water as from a well. Immediately on filling the casks, they were obliged to carry them off with all possible speed, lest the water should be congealed, as in fact about a third part of it was by the time it could be brought to the place where it was wanted. In order to prevent it as much as possible from freezing, they constantly kept stirring it about with a stick; but even this operation had only a partial effect. At last, by the united power of many engines, which launched forth a great mass of water, the fire was got under, after destroying only the roof, the house itself being very little damaged.

It was in the upper stories of the building that the stock of sugar was deposited; there were also many vessels full of treacle, which being broken by the falling in of the roof, the juice ran down along the sides of the walls. The water thrown up to the top of the house by the engines, and flowing back on the walls and staircases, and through the windows, was stopped in its downward course by the mighty power of the frost. After the fire was extinguished, the engines continued for some time to play and the water they discharged was frozen almost the instant it came in contact with the walls already covered with ice. Thus a

house was formed of the most extraordinary appearance that it is possible to conceive. It was so curious an object that every body came to gaze at it as something wonderful. The whole building from top to bottom was incrusted with a thick coat of ice; the doors and windows were closed up, and in order to gain admission it was necessary with hammers and hatchets to open a passage; they were obliged to cut another staircase through the ice, for the purpose of ascending to the upper stories.

All the rooms, and what remained of the roof, were embellished by long stalactites of multifarious shapes and of a yellowish colour, composed of the treacle and congealed water. This building, contemplated in the light of the sun, seemed to bear some analogy to those diamond castles that are raised by the imaginations of poets. It remained upwards of two months in the same state, and was visited by all the curious. The children in particular had excellent amusement with it, and contributed not a little to the destruction of the enchanted palace, by searching for the particles of sugar, which were found in many places incorporated with the ice.—*Frostiana.*

A PALACE BUILT OF ICE.

In the year 1740, the Empress Anne of Russia, caused a palace of ice to be erected upon the banks of Neva. This extraordinary edifice, was 52 feet in length, 16 in breadth, and 20 feet high, and constructed of large pieces of ice cut in the manner of free-stone. The walls were three feet thick. The several apartments were furnished with tables, chairs, beds, and all kinds of household furniture of ice. In front of this edifice, besides pyramids and statues, stood six cannon, carrying balls of six pounds' weight, and two mortars, entirely made of ice. As a trial from one of the former, an iron ball, with only a quarter of a pound of powder was fired off, the ball of which went through a two-inch board, at sixty paces from the mouth of the piece, which remained completely uninjured by the explosion. The illumination in this palace, at night, was astonishingly grand.—*Frostiana.*

COLD AND HOT WINDS

THE cold winds called Harmatans, are not at all more extraordinary than the burning winds on the coast of Persia, which are terrible to the last degree, and in the months of June, July, and August, render Gambroon the only port which the Persians have on that side uninhabitable. These winds blow in a very narrow compass, and are sensibly felt, and therefore avoidable, which is done by throwing one's self flat on the ground till they are past over. If a man is on horse-back when he meets them, he must dismount and turn his horse's tail to the wind, and then lying down by him he preserves the beast's life and his own.

There was, in the year 1712, a very singular instance of the malignity of these winds. Two French gentlemen would needs travel in the month of July, from Gambroon to Ispahan, notwithstanding all that the chief of the English factory could say to dissuade them, believing probably that what he told them was only the fables of the country, for which they paid dearly. The general rule for travellers is to set out between three and four in the morning and travel till nine, which rule those French gentlemen observed, and being fatigued by their morning's journey, as soon as they came to a caravansary, (which are lodgings built at the end of every stage, which consists of about fifteen miles,) they were disposed to rest, and ordered their servants to make their beds ready, (for even that necessary furniture, travellers are obliged to carry along with them on carriage beasts,) directing them to call them when dinner was ready, and withal ordered a sheet for each of them, to be dipped in water, to lay over them to cool them. One of these hot blasts unfortunately came whilst the gentlemen slept, and had left the windows of the room open, when the wind blowing in at the windows scorched them both to death on their beds, where the servants found them when dinner was ready, and pulling off the sheets the skin and some flesh came off with them.

It is certainly a great happiness to our country, that we have none of those dreadful winds. But this, however, need not restrain us from endeavouring to discover their

causes, and the manner of their extraordinary operations, which perhaps might be of use in accounting for damps in mines and other places, which induced me to give them a place here, as matters that could not be unacceptable to the curious.—*Shepherd of Banbury's Rules.*

AVALANCHES.

THE avalanches, or snow-balls, which sometimes gather and roll down the sides of the mountains on the Alps, are equally surprising and dangerous to travellers; they are occasioned by the dropping of a quantity of snow from some prominent rock, which increases as it falls down the steep declivities, till it becomes of a prodigious size, and sweeps away houses, trees, men, horses, or whatever it meets with in its passage. As they fall suddenly, and with great rapidity, it is very difficult for passengers to avoid them; and nothing is able to resist their force till they get to the bottom, where they are generally broken in pieces by the violence of the shock. Some of these mountain snow-balls have been found, by measuring their track, to be above a hundred yards in diameter; and one of them, in the year 1695, fell upon a village in the night time, and destroyed eleven houses, besides barns and stables, burying men, women, and cattle in the ruins. These terrible accidents are sometimes produced even by the leaping of a chamois, the firing of a pistol, or any noise that shakes the air, and loosens the snow from the rocks above: for which reason, in places of the greatest danger, people are careful to travel early, and with all possible silence. Some of these avalanches, indeed, are not so destructive; for consisting of new fallen snow, driven by the wind, they are lighter, and persons buried under them may live a long time without being suffocated, and are often relieved by men kept in pay to clear the roads, and give assistance on such occasions.

Mrs. Charlotte Smith pathetically describes these falling masses of snow in the following lines:

Where cliffs arise by winter crown'd,
And through dark groves of pine around,

Down the deep chasms the snow-fed torrents foam;
Within some hollow, shelter'd from the storms,
The peasant of the Alps his cottage forms,
And builds his humble, happy home.

But absent from this calm abode,
Dark thunder gathers round his road,
Wild raves the wind, the arrowy lightnings flash;
Returning quick the murmuring rocks among,
His faint heart trembles as he winds along:
Alarmed! he listens to the crash

Of rifted ice! Oh, man of woe!
O'er his dear cot—a mass of snow,
By the storm sever'd from the cliff above,
Has fallen,—and buried in its marble breast
All that for him, lost wretch, the world possess'd,
His home, his happiness, his love!

Aghast the heart-struck mourner stands,
Glaz'd are his eyes, convuls'd his hands,
O'erwhelming anguish checks his labouring breath;
Crush'd by despair's intolerable weight,
Frantic, he seeks the mountain's giddiest height,
And headlong seeks relief in death.

BURNING MOUNTAINS.

MOUNT VESUVIUS.

Mount Vesuvius is situated at the distance of five Italian miles from the city of Naples, and is justly accounted one of the most dreadful volcanos in the world. Its declivity towards the sea is richly clothed with vines and fruit-trees, the circumambient air is clear and salubrious, and the neighbouring plain affords a most delightful prospect; but the ascent to the summit is painfully tedious: and, after walking two miles over a kind of burnt earth, mixed with calcined stones and cinders, the tra-

MOUNT_VESUVIUS.

veller arrives at a naked plain, from severa parts of which issues a sulphurous smoke, and in the centre of it rises another hill, shaped like a sugar loaf, and of more difficult access than the former.

At the summit of this hill is a vast mouth, or cavity, about 400 yards in diameter at the top, but shelving down on all sides like a funnel, whence proceeds a continual smoke, and sometimes those astonishing eruptions of flame, ashes, and burning matter, which fill the neighbouring villages with consternation. Every time it darts forth its flames, and pours forth its liquid matter, the exterior form of the mountain, as well as its height, receive considerable alterations. In a small plain, resembling a half moon, situated between the mountain of cinders and a semicircular theatre of steep rocks, 200 feet high, M. de la Condamine viewed closely the breathing holes, opened in the sides of the mountain, through which, at the time of the late eruption, those torrents of inflamed matter had escaped, to which they give the name of lava, and with which all this valley is filled. This singular spectacle presents us, says he, with the appearance of metallic waves grown cold, and in a state of congelation. One may form a slight idea of it, by supposing to ourselves a sea of thick and tenacious matter, the waves of which were beginning to subside. This sea had its isles, which are solitary masses, resembling hollow spongy rocks, opening into arcades and grottos fantastically formed, beneath which the burning liquid matter had opened itself magazines or reservoirs, similar to furnaces. These grottos, with their vaults and pillars, all the pure work of nature, were loaded with scoriæ, suspended around them in the form of stalactites, or irregular clusters of grapes, of various colours.

In ancient history, we find dismal accounts of the devastations occasioned by this volcano; and, in later ages, we meet with instances of its raging with extraordinary fury. In the year 1694 there was a violent eruption, which continued great part of the month of April, and threw up ashes, stones, *&c.*, with such force, that some of them reached Benevento, nearly thirty miles distant. A prodigious quantity of melted minerals was likewise thrown out of the mouth, and ran slowly down the sides

of the mountain, insomuch that great numbers of men were employed to cut trenches and channels to receive it, and prevent its spreading over the plains below. At this time, when the wind was in the east, the houses and streets of Naples were literally covered with ashes.

In the summer of 1707 there happened another terrible eruption, attended with such a rumbling and bellowing of the mountain, as far exceeded the report of the largest artillery. Having thrown up clouds of ashes into the air for several days and nights, and a shower of stones that killed both men and cattle, it began to throw out a liquid torrent of bitumen, which resembled a gentle stream of fire, and, cooling in its progress, became as hard as flint at the bottom, but more porous and spongy on the surface. After this, frequent flashes of fire, like lightning, proceeding from its mouth, followed by loud claps of thunder; and such a thick cloud of ashes hovered over Naples, that the darkness was equal to that of midnight. Next day, by the shifting of the wind, the ashes were driven another way; and the mountain having raged in this manner about fifteen days, the eruption entirely ceased.

Mr. Edward Berkely, afterwards Bishop of Clogher, in Ireland, gives the following description of an eruption which happened in the year 1717. On the 5th of June the mountain was observed to throw a little out of the crater, and the same continued the day following. The 7th, in the evening, it began a hideous bellowing, which continued till noon the next day, causing the windows and even the houses, in Naples to shake. From that time it vomited vast quantities of melted matter to the south, which streamed down the side of the mountain like a pot boiling over. On the 10th, it roared and groaned most dreadfully; of which one cannot form a juster idea, than by imagining a mixed sound, made up of the raging of a tempest, the murmur of a troubled sea, and the roaring of thunder and artillery, confused together.

This induced our author, with three or four more in company, to visit the mountain; and they arrived at the burning river about midnight, when the roaring of the volcano was exceeding loud and horrible. There was a mixture of colours in the cloud over the crater, a ruddy dismal light in the air over the fiery torrent, and ashes

continually showering upon their heads; all which circumstances, augmented by the horror and silence of the night, made a most uncommon and astonishing scene. Imagine, says he, a vast torrent of liquid fire rolling along the side of a mountain, and with incredible fury bearing down vines, olives, fig-trees, houses, and every thing that stood in its way. The largest stream seemed half a mile broad at least, and five miles long; and Mr. Berkely walked so far up the mountain by the side of this burning river, that he was obliged to retire with precipitation, the sulphurous stream having surprised him, and almost taken away his breath. They returned about three in the morning, hearing constantly the murmur and groaning of the mountain, which occasionally burst into louder peals, throwing up huge spouts of fire and burning stones, which in their fall resembled the stars in our rockets. Sometimes there appeared two or three distinct columns of flame, and sometimes only a single one, that seemed to fill the whole crater. It was judged that the flames and fiery stones were shot more than a thousand feet perpendicular above the summit of the volcano, which continued raging in this manner, more or less, till the 18th, when the whole appearance ended, and the mountain remained perfectly quiet. During this eruption the cinders showered down so fast at Naples, that the citizens were obliged to screen themselves beneath umbrellas; and vessels at the distance of twenty leagues were exposed to equal inconvenience.

In 1779 another eruption happened, which has been particularly described by Sir William Hamilton in the *Philosophical Transactions.* This gentleman, during his residence at Naples, had an opportunity of making several observations on the lavas of Vesuvius, and found that they constantly formed regular channels in the mountain. These channels, after small eruptions, were generally from two to six feet wide, and about eight in depth; and were often hid from the sight by a quantity of scoriæ, that had formed a kind of crust over them. Sir William walked in some of these subterraneous galleries, which appeared extremely curious, some being remarkably smooth and even on the top, sides, and bottom; and others incrusted with a remarkable scoriæ, beautifully ramified with salts, in the form of depending stalactites, &c

On viewing a stream of lava in its fluid state, our author perceived that, after passing through the above-mentioned channels, it extended into the valley, and flowed gently along, like a river that had been frozen, and had masses of ice floating upon it. Being greatly incommoded by the smoke, he passed over the heated crust, and walked along the side of the current to its very source. Here he perceived it boiling violently out of the ground, with a hissing and crackling noise, like that of an artificial fire-work. A hillock about 15 feet high was formed by the splashing up of the vitrified matter; and under this was an arched hollow, whence the lava issued into a regular channel, raised upon a wall of scoriæ and cinders, nearly 10 feet high, and greatly resembling an ancient aqueduct. On leaving this spot, Sir William proceeded up to the crater, where he found the little mountain discharging stones and red-hot scoriæ with loud explosions, but the intolerable smoke and stench of sulphur soon compelled him to retire.

By the eruption which happened in this year (1779), the curious channels of scoriæ were destroyed, and the cone of the mountain was entirely covered with a stratum of lava, from the cracks of which issued a sulphurous smoke, that tinged the cinders with a yellow or whitish tint. The pores of this lava generally abounded with perfect vitrification, and the scoriæ, if viewed through a magnifying glass, appeared like a confused mass of filaments of a foul vitrification. When a piece of the solid lava had been cracked in its fall, without totally separating, fibres of perfect glass might be seen, reaching from side to side within the cracks. This kind of volcanic glass is of a dirty yellow colour, and has much the same transparency with our common glass bottles; but when large pieces of it are broken off by a hammer, it appears perfectly opaque.

In the summer of 1794, another dreadful eruption took place at Vesuvius, which destroyed many of the adjacent villages, and was attended by many surprising phenomena. According to the account of Sir William Hamilton (who has been justly styled the Natural Historian of Vesuvius) the eruption was preceded by a powerful shock of an earthquake, which extended over the whole of the Cam-

pagna Felice, and was plainly felt at the distance of 40 miles.

On Sunday, the 15th of June, another shock was felt at Naples, but did not appear quite so violent as that of the 12th, nor did it continue so long: at the same moment, a fountain of bright fire, attended with very black smoke and a loud report, issued from the middle of the cone of Vesuvius. Soon after, a similar one broke out at some distance lower down; and then it appeared as if the lava had taken its course directly up the steep cone of the volcano. Fresh fountains quickly succeeded, and all in a direct line, flowing toward the towns of Resina and Torre del Greco. It is impossible that any description can give an adequate idea of this fiery scene, or of the horrid noises that attend this great operation of nature. It was a mixture of the loudest thunder with incessant reports like those from a heavy artillery, accompanied by a continued hollow murmur, like the roaring of the ocean during a violent storm; and added to these was another blowing noise, like that of a large flight of sky-rockets. The frequent falling of the huge stones and scoriæ, which were thrown up to an incredible height, and one of which measured thirty-five feet in circumference, contributed to the concussion of the earth and air, which kept all the houses in Naples in a constant tremour for several hours, every door and window shaking, and the bells ringing incessantly. This was an awful moment. The sky, from a bright full moon and star-light, began to be obscured; the moon gradually seemed to suffer an eclipse, and was soon lost in obscurity; and the prayers and lamentations of a numerous populace parading the streets, added likewise to the general horror.

About four o'clock in the morning of the 16th, the crater of Vesuvius began to show signs of being open, by some black smoke issuing out of it; and at day-break, another smoke tinged with red issued from an aperture near the crater, whilst a considerable stream of lava issued from the other side of the mountain, and ran with great velocity through a wood, which it destroyed. The conical part of Vesuvius was totally involved in dark clouds; but above these we could often discern fresh columns of smoke rising furiously from the crater, until the whole mass re-

mained in the usual form of a pine-tree, and amidst that gigantic mass of clouds, the volcanic lightning was frequently visible.

About five o'clock on the morning of the 16th, we perceived that the lava which had broke out from several new mouths on the south side of the mountain, had reached the sea, and was running into it, having overwhelmed and burnt the greatest part of Torre del Greco. Soon after the beginning of this eruption, ashes fell thick at the foot of the mountain, from Portici to the Torre de Greco, and although there were not at that time any clouds in the air, except those of smoke from the mountain, the ashes were accompanied with large drops of water, and the road was as wet as if there had been a heavy shower of rain.

By the time the lava had reached the sea, Vesuvius was so completely involved in darkness, that we could no longer discern the violent operation of nature that was going on there; but the dreadful noises we heard at times, and the red tinge on the highest clouds, were evident signs of the activity of the fire underneath.

The lava ran but slowly at Torre del Greco after it had reached the sea; and on the morning of the 17th when I went in my boat to visit that unfortunate town, its course was stopped, excepting that at times a small rivulet of liquid fire issued from under the smoking scoriæ into the sea, discovering it to be red-hot under that surface. I observed that the sea-water was boiling, as if in a caldron, where it washed the foot of a new-formed promontory, and although I was a hundred yards distant from it, the pitch from the bottom of my boat was observed to melt away, and we therefore retired hastily from this spot.

On Wednesday, June 18th, the wind having for a short time cleared away the thick clouds from the summit of Vesuvius, we discovered that a great part of its crater had fallen in, and that the ashes which before were as fine as Spanish snuff, were now of such density as to appear to have the greatest difficulty in forcing their passage. One cloud heaped on another, and succeeding each other incessantly, formed in a few hours such a gigantic column over the mountain, as seemed to threaten Naples with immediate destruction, bending over the city,

and appearing much too ponderous to remain long suspended in the air.

Vesuvius was, at this time, completely covered with a thick coat of light grey ashes, which gave it a horrid appearance; and in comparison of the above-mentioned mass of clouds, it appeared like a mole-hill, although the perpendicular height of the mountain is upwards of 3,600 feet.

The storms of thunder and lightning, occasionally attended with heavy falls of rain and ashes, causing the most destructive torrents of water and glutinous mud, mixed with huge stones, and trees torn up by the roots, continued to afflict the inhabitants on both sides of the volcano, until the 7th of July, when the last torrent destroyed many hundred acres of cultivated land, between the towns of Torre del Greco and Torre del Annunziata.

On the 30th of June, Sir William ventured to ascend the volcanic mountain, but not without considerable risk. The crater (says he), except at short intervals, had been continually obscured by clouds, ever since the 16th, and was so this day, with frequent flashes of lightning, and attended, as usual, with a noise like that of thunder. I went up the usual way by Resina, and observed, in passing through the village, that many of the stones of the pavement had been loosened, and were deranged by the earthquakes. The leaves of all the vines were burnt by the ashes that had fallen on them, and many of the vines themselves were completely buried. In short, nothing but ruin and desolation was to be seen. The ashes at the foot of the mountain were about ten inches thick on the surface of the earth, but in proportion as we ascended, their thickness increased to several feet; so that the surface of the old rugged lavas was now become a perfect plain. We ascended to the spot whence the lava of the 15th had issued, and we followed its course, which was still very hot, down to the sea at Torre del Greco, which is more than five miles. The horrid chasms from the spot where the late eruption took place, in a straight line for nearly two miles toward the sea, cannot be imagined. They formed valleys more than 200 feet deep, and from half a mile to a mile wide; and where the fountains of fiery matter existed during the eruption, are little mountains with deep craters. Ten thousand men, in as many years, could not

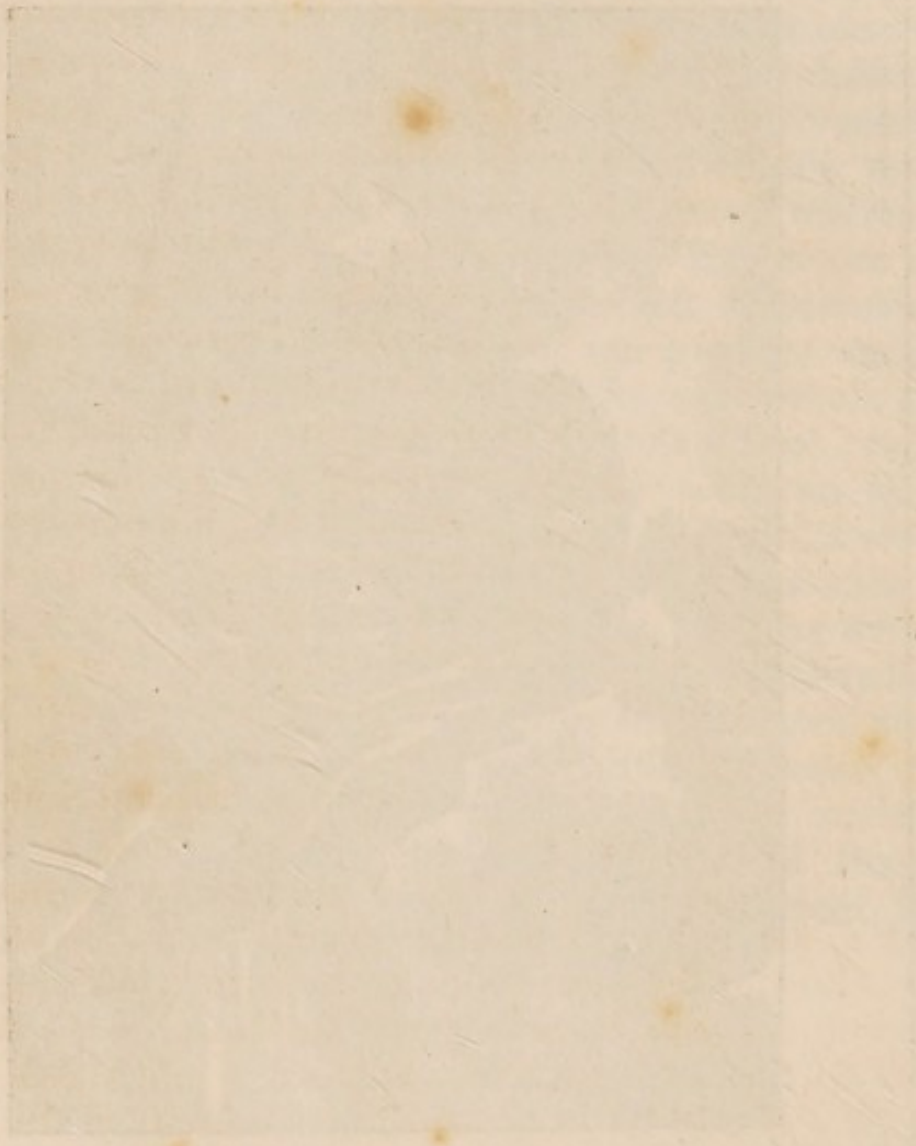
surely make such an alteration on the face of Vesuvius, as had been made by nature in the space of a few hours.

It has been observed, however, that though Mount Vesuvius often fills the neighbouring country with terror, yet as few things in nature are so absolutely noxious as not to produce some good, even this raging volcano, by its sulphurous and nitrous manure, and the heat of its subterraneous fire, contributes to the uncommon fertility of the country, and the profusion of fruit, herbage, &c., with which it is every where covered. Those are observed to be the most fertile spots which abound in sulphur, saltpetre, &c., and if such igneous and inflamable substances were pent up, their fermentation and ebullition would be productive of the most calamitous effects; whereas they find a vent through these volcanos. Experience shews, that earthquakes, after any continued eruptions of Vesuvius, are neither so frequent, nor produce such fatal effects as at other times. Hence the inhabitants are far from being alarmed at this mountain's vernal eruptions, when they are not violent; and the air is so far from being rendered unhealthy by them, that Barra, a village at the foot of Vesuvius, near the sea, is remarkable for its healthfulness. To these advantages, it may be added, that M. de la Condamine observes, that the above lava, or liquid matter, on its cooling, forms solid masses, surpassing in hardness even that of marble; whence tables, chimney-pieces, and even snuff-boxes, are made of it. With this matter the cities of Naples and Rome are paved, as are also a great part of the ancient Roman highways.—SMITH'S *Wonders.*

MOUNT ETNA.

MOUNT ETNA, in the island of Sicily, appears to have been well known to the ancients, on account of its fiery eruptions; for Pindar speaks of it as a volcano, and Plato was invited by the younger Dionysius to examine the state of the mountain after the sixth eruption. It threw out flames and lava about a hundred times between that period and the battle of Pharsalia, and was remarkably furious while Sextus Pompeius was adding the horrors of

MOUNT ETNA.



a sanguinary war to its terrific devastations. Charlemagne is said to have been at Catania during one of its eruptions; and since his reign we find fifteen more recorded.

With respect to the dimensions of Mount Etna, it is extremely difficult to extract any thing consistent, even from the accounts of modern and truly respectable travellers. Pindar, who flourished about 435 years before the Christian era, calls it the "Pillar of Heaven," on account of its astonishing elevation; and all the moderns agree that it is extremely high and large, but they differ excessively in their descriptions, some making it eight or twelve miles high, and 180 miles round, while others reduce it to about two miles in height, and somewhat less than 90 miles in circumference. After investigating these different relations, and considering their prodigious difference, we must give it as our opinion, that the true dimensions of the mountain have not yet been exactly ascertained.

Concerning the general appearance and products of Etna, authors are better agreed; and the journey from Catania to its summit has been recently described by three ingenious travellers. M. D'Orville, Mr. Brydone, and Sir William Hamilton, all of whom affirm, that this mountain affords an epitome of the different climates throughout the world. Towards the base it is extremely hot, farther up more temperate, and grows gradually more cold, till at length the traveller perceives that its head is enveloped in a mantle of eternal snow.

The top of Mount Etna being above the common region of vapours, the prospects from thence are peculiarly interesting, and the heavens appear to possess an extraordinary splendour. Mr. Brydone and his companions observed as they ascended at night, that the number of stars seemed to be greatly augmented; that each of them sparkled with unusual brilliancy, and that the whiteness of the milky-way, resembled a blue flame shooting across the skies. To have a clear and ample prospect from this mountain, it is necessary to ascend before sun-rise, as the vapours raised by the sun in the day-time tend to obscure the circumjacent scenery. Here Sir William Hamilton and Mr. Brydone had a delightful view of Calabria, in Italy, with the sea beyond it: the Lipari islands, and

Stromboli, a volcano at 70 miles distance, seemed to be just under their feet; the island of Sicily, with its rivers, towns, and harbours, appeared as distinct as if delineated on a map; and the pyramidal shadow of the mountain reached entirely across the island, and far into the sea on the other side, forming a visible tract in the air, which is gradually shortened as the sun rises above the horizon.

Etna is divided into three regions; the *Regione Culta*, or cultivated; the *Silvosa*, or woody; and the *Descrta*, or desert region; all of which are plainly distinguished from the summit. The *Regione Culta* is much broader than the rest, and extends on all sides from the foot of the mountain, being bounded by the sea on the south and south-east, and on the other sides by the rivers Semetus and Alcantara. Here terrible devastations are sometimes committed by the eruptions, and the whole region abounds with little conical mountains. The *Regione Silvosa* forms a circle of beautiful green, surrounding the mountain on every side, and variegated, like the former, by a number of mountains of a conical form, thrown up by the eruptions which burst out of the sides of the volcano. Sir William Hamilton counted forty-four on the Catania side, each having its crater, and being prettily feathered with trees, which seem to have acquired a wonderful degree of fretility. The *Regione Deserta* is marked out by a circle of snow and ice, which extends on all sides to the distance of eight miles, beginning at the foot of the crater.

In the middle of the snowy region stands the great mouth of the volcano, which Sir William Hamilton describes as a little mountain about a quarter of a mile perpendicular, and situated in the centre of a gently inclining plain of about nine miles in circumference. In the middle of this little mountain is a large hollow, the inside of which is incrusted with salts and sulphur of different colours. From many parts of this aperture issue volumes of sulphurous smoke, which, being heavier than the circumambient air, roll down the side of the mountain, till coming to a more dense atmosphere, it shoots off horizontally, and forms a tract in the air according to the direction of the wind. In the midst of this funnel is the terrific and unfathomable gulf, whence continually issue terrible and confused noises, which, during an eruption, may be

heard at a prodigious distance. Sir William Hamilton and Mr. Brydone found the crater too hot to admit of their descending into it; but M. D'Orville and his fellow-traveller, having fastened themselves with ropes which some men held at a distance, descended as near as possible to the brink of the gulf, where they saw distinctly a conical mass of matter, which rose to the height of about sixty feet, and seemed to be about six hundred feet in circumference toward the base. Whilst they were viewing this substance, the internal roarings augmented, and the mountain began to send forth smoke and ashes, but after a momentary dilation the volcano resumed its former tranquillity.

About a mile below the foot of the great crater, are the ruins of an ancient structure, called Il Sorre del Filosofo, which some imagine to have been built by the philosopher Empedocles, and others suppose to have been a temple of Vulcan. These ruins are of brick, and seem to have been ornamented with marble.

The woody region, particularly on the east side, abounds with large chestnut-trees, one of which has been called, from its extraordinary size, *Castagno de Cento Cavalli*, or the chestnut-tree of a hundred horse. Mr. Brydone was much disappointed at the sight of this tree, as he found it to be only a bush of five large ones growing together; but his guides assured him, that all these were once united in one stem; and Signior Recupero asserted, that having caused some peasants to dig round this bush of trees, he had found all the stems united under ground in one root. The space of ground occupied by these five trees measured 204 feet in circumference. Another of these trees, called the *Castagna de Galia*, rises from the solid stem to a considerable height, and its circumference at a small distance from the ground is 76 feet; and Massa, one of the most respectable Sicilian authors, asserts, that he has seen solid oaks there upwards of 40 feet round.

At the foot of a mountain, raised by the eruption, in 1669, is a hole, leading to several subterraneous caverns, some of which afford an asylum to wild pigeons, and others are used as magazines for snow. Here also is the river Acis (celebrated in the fable of Acis and Galatea), which bursts out of the earth in a large stream, runs with surprising rapidity, and about a mile from its source falls

into the sea. Its water is remarkably clear, but being excessively cold, and strongly impregnated with vitriol, it is reckoned dangerous to drink it.

The great eruption of this volcano, in 1669, broke out on the 11th of March, two hours before night, on the south-east side of the mountain, about twenty miles from the old mouth, and ten from the city of Catania. The noise of the eruption was heard a hundred miles off, to which distance the ashes were likewise carried. The matter thrown out was a stream of metals and minerals, rendered liquid by the fierceness of the fire, which boiled up at the mouth like water at the head of a great river; and having run a little way, the extremity thereof began to crust and curdle, turning into hard and porous stones called sciarri, resembling large cakes of burning sea-coal. These came rolling over each other, bearing down any common building by their weight, and burning whatever was combustible. At first the progress of this inundation was at the rate of three miles in twenty-four hours, but afterwards it scarcely advanced a furlong in a day; and thus it continued for fifteen or twenty days together, running into the sea, close by the walls of Catania. At length it made its way over the walls into the city, where, however, it did no considerable damage, except to a convent of Benedictines. In its course it overwhelmed fourteen towns and villages, containing three or four thousand inhabitants; and it is remarkable, that during the whole time of this eruption, which was fifty-four days, neither sun nor stars appeared.

But though Catania had this time the good fortune to escape the threatened destruction, it was almost totally ruined in 1692 by an earthquake, which was not only felt all over Sicily, but likewise in Naples and Malta; and the shock was so violent, that people could not stand upon their legs, and those who lay upon the ground were tossed from side to side, as if upon a rolling billow. The earth opened in several places, throwing up large quantities of water, and great numbers perished in their houses by the fall of rocks that were loosened and rent from the mountains. The sea was violently agitated, and roared dreadfully, Mount Etna threw up vast spires of flame, and the shock was attended with a noise exceeding the loudest claps of thunder. Fifty-four cities and towns, with an in-

credible number of villages, were either destroyed or greatly damaged; and it was computed that near 60,000 persons perished in different parts of the island, of whom 18,000 were inhabitants of Catania, very few escaping the general and sudden destruction of that city.

In the eruption which happened in 1766, the lava sprung up into the air to a very considerable height; but the stream which it formed was only six miles in length, and one mile in breadth. The last eruption happened in 1787. On the 11th of July there was a subterraneous noise, followed by a copious discharge of black smoke. It was then calm till the 15th, when the same prognostics recurred; on the 17th the subterraneous noise was augmented, the smoke issued out in greater abundance, some slight shocks of an earthquake were felt, and a rivulet of lava began to flow from behind one of the little mountains which form the double head of Etna. On the 18th some new shocks were perceived, and the mountain threw out a thick smoke, which darkened the eastern horizon, and was quickly succeeded by showers of black sand, stones, scoriæ, and lava. These appearances continued till sunset, but then the scene was entirely changed. Several conical flames rose from the volcano; one on the north and the other on the south, were particularly conspicuous, and rose and fell alternately. At three o'clock in the morning, the two heads of the mountains seemed to be cut away, and at their separation was a conical flame, which appeared about two miles high, on a base of a mile and a half in diameter. This cone was still covered with a thick smoke, in which there sometimes appeared very brilliant flashes of lightning, while a jet of flaming matter was thrown to the distance of six or seven miles; and sounds, like the explosion of cannon, were frequently heard at a small distance. From the 20th to the 22nd, these terrific appearances gradually subsided, and the stream of lava was carried towards Bronte, and the plain of Lago. Subsequent to this eruption, the top of the mountain on the western side was covered with hardened lava, stones, and scoriæ, and travellers were dreadfully annoyed by smoke, showers of sand, mephitic vapours, and excessive heat. The lava on the western head of the mountain had evidently been in a state of fusion; and the colour which rose

from one of the spiracular was that of liver of sulphur.—SMITH'S *Wonders.*

MOUNT HECLA IN ICELAND.

ICELAND is particularly noticed for its volcanoes, which seem to be more furious than any other yet discovered; and from the most recent accounts it appears as if this wretched country were one continued volcano.

Mount Hecla, one of the most terrible of these volcanos, is situated in the south-east part of the island, at a small distance from the sea; and has frequently sent forth flames, and a torrent of burning matter, from which circumstances the simple inhabitants have been led to suppose that this was the place where the souls of wicked men are eternally tormented. Its eruptions have been very frequent; and in the year 1693 they occasioned much devastation, the ashes being thrown all round the island, to the distance of 180 miles. It takes up four * hours to ascend from the foot of this mountain to its summit: and on the north-west side is a vast chasm, reaching from the top almost to the bottom. It appears from respectable authority, that while flames and ignited matter issued from this chasm, the huge masses of ice and snow on the opposite side were not melted, although the heat was so intense, as to calcine large stones and other substances.

This volcanic mountain was visited in the year 1772, by Dr. Van Troil, Sir Joseph Banks, Dr. Solander, and Dr. James Lind, of Edinburgh; who, on their first landing, found a tract of land about 70 miles in extent, entirely ruined by lava, which appeared to have been in the highest state of liquefaction. After passing, for some time, over an uninterrupted tract of lava, they arrived at the first opening, from whence the fire had burst, and which is described as a curious place, surrounded with lofty glazed walls, and high glazed cliffs. In another opening, a little higher up, they plainly discerned the effects of boiling water; and about two hundred yards below the summit, they found a chasm, a yard and a half in diameter, whence issued so

* From an exact observation with Ramsden's barometer, Mount Hecla is 5000 feet above the level of the sea.

hot a steam, that they could not measure the degree of heat with their thermometer. The cold now began to be very intense, and the wind became so violent, that they were sometimes obliged to prostrate themselves on the ground, in order to elude its extraordinary fury. On the very summit they experienced, at the same time, a strong degree of heat and cold; for, in the air, Fahrenheit's thermometer stood constantly at 24, but when set on the ground it rose to 153. They observed that the mountain was composed of sand, grit, and ashes, which have been thrown up with the stones, partly discoloured, and partly melted by the fire. Pumice-stones, common lava, red slate, and a quantity of black jasper, burnt at the extremities, were particularly noticed by the travellers: and as they descended the mountain, they observed three curious openings.—In one every thing looked as red as brick; from another the lava had flowed in a stream about fifty yards broad, and after proceeding some length, had divided into three branches; and on bottom of the last they perceived a mount, shaped like a sugar-loaf, in throwing up which, the fire had probably exhausted itself.

It appears, however, that out of fifty-one remarkable eruptions, only one-third have proceeded from Mount Hecla: for although this has been commonly regarded as the chief volcano on the island, the other mountains have been no less active in the work of destruction.—SMITH'S *Wonders.*

THE YANAR, OR VOLCANIC FLAME.

CAPTAIN BEAUFORT, of His Majesty's Ship Frederickstein, gives the following remarkable account of a volcanic flame, which he discovered on the island of Delicktash, on the South coast of Asia Minor.

We had seen (says this gentleman,) from the ship the preceding night, a small but steady light among the hills; on mentioning the circumstance to the inhabitants, we learned that it was a *Yanar*, or volcanic flame, and they offered to supply us with horses and guides to examine it.

We rode about two miles, through a fertile plain partly cultivated: and then winding up a rocky and thickly-

wooded glen, we arrived at the place. In the inner corner of a ruined building the wall is undermined, so as to leave an aperture of about three feet diameter, and shaped like the mouth of an oven: from thence the flame issues, giving out an intense heat, yet producing no smoke on the wall; and though from the neck of the opening we detached some small lumps of caked soot, the walls were hardly discoloured. Trees, brushwood, and weeds, grow closely round this little crater; a small stream trickles down the hill hard by, and the ground does not appear to feel the effect of its heat at more than a few feet distance. The hill is composed of crumbly serpentine, with occasional loose blocks of limestone, and we perceived no volcanic productions whatever in the neighbourhood.

At a short distance lower down the side of the hill, there is another hole, which has apparently been at some time the vent of a similar flame; but our guide asserted, that, in the memory of man, there had been but the one, and that it had never changed its present size or appearance. It was never accompanied, he said, by earthquakes or noises; and it ejected no stones, smoke, nor any noxious vapours, nothing but a brilliant and perpetual flame, which no quantity of water could quench. The shepherds, he added, frequently cooked their victuals there, and he affirmed with equal composure, that it was notorious that the Yanar would not roast meat that had been stolen.

This phenomenon appears to have existed here for many ages, as unquestionably this is the place which Pliny alludes to in the following passage.—"Mount Chimæra, near Phaselis, emits an unceasing flame, that burns day and night." We did not, however, perceive that the adjacent mountains of Hephæstia were quite so inflammable as he describes them. The late Colonel Brooke who lived for many years among the islands of the Archipelago, informed me that high up the western mountain of Samos he had seen a flame of the same kind, but that it was intermittent.—BEAUFORT'S *Survey of Karamania.*

THE MOUNTAIN OF SULPHUR.

Sir G. Mackenzie, in his Travels in Iceland, gives the following description of this wonderful phenomenon.

At the foot of the mountain was a small bank composed chiefly of white clay, and some sulphur, from all parts of which steam issued. Ascending it, we got upon a ridge immediately above a deep hollow, from which a profusion of vapour arose, and heard a confused noise o boiling and splashing, joined to the roaring of steam escaping from narrow crevices in the rock. This hollow, together with the whole side of the mountain opposite, as far up as we could see, was covered with sulphur and clay, chiefly of a white or yellowish colour. Walking over this soft and steaming surface we found to be very hazardous; and we were frequently very uneasy when the vapour concealed us from each other. The day however being dry and warm, the surface was not so slippery as to occasion much risk of our falling. The chance of the crust of sulphur breaking, or the clay sinking with us, was great; and we were several times in danger of being much scalded. Mr. Bright ran at one time great hazard, and suffered considerable pain from accidentally plunging one of his legs into the hot clay. From whatever spot the sulphur is removed, steam instantly escapes; and, in many places, the sulphur was so hot that we could scarcely handle it. From the smell we perceived that the steam was mixed with a small quantity of sulphuretted hydrogen gas. When the thermometer was sunk a few inches into the clay, it rose generally to within a few degrees of the boiling point. By stepping cautiously, and avoiding every little hole from which steam issued, we soon discovered how far we might venture. Our good fortune, however, ought not to tempt any person to examine this wonderful place without being provided with two boards, with which every part of the banks may be traversed in perfect safety. At the bottom of this hollow we found a caldron of boiling mud, about fifteen feet in diameter, similar to that on the top of the mountain, which we had seen the evening before; but this boiled with much more vehemence. We went within a few yards of it, the wind happening to be remarkably favourable for viewing every

part of this singular scene. The mud was in constant agitation, and often thrown up to the height of six or eight feet. Near this spot was an irregular space filled with water, boiling briskly. At the foot of the hill, in a hollow formed by a bank of clay and sulphur, steam rushed with great force and noise from among the loose fragments of rock.

It is quite beyond our power to offer such a description of this extraordinary place, as to convey adequate ideas of its wonders or its terrors. The sensations of a person, even of firm nerves, standing on a support which feebly sustains him, over an abyss where, literally, fire and brimstone are in dreadful and incessant action; having before his eyes tremendous proofs of what is going on beneath him; enveloped in thick vapours; his ears stunned with thundering noises; must be experienced before they can be understood.

EVERLASTING FIRE.

In the neighbourhood of Baku, on the Caspian Sea, is a phenomenon of a very extraordinary nature, called the *everlasting fire*, to which a sect of Indians and Persians, called Gaurs, pay religious worship.

It is situated about ten miles from the city of Baku, in the province of Shirvan, on a dry rocky spot of ground. Here are several ancient temples built with stone, and supposed to have been all dedicated to fire; and, among the others, there is a little temple, in which the Indians now worship. Near the altar is a large hollow cane, from the end of which issues a blue flame, in colour and gentleness resembling a lamp, but seemingly more pure. The Indians affirm that this flame has continued ever since the flood; and they believe that if it were resisted or suppressed in that place, it would break out, and rise in some other.

At a short distance from this temple is a low cliff of a rock, in which there is a horizontal gap, two feet from the ground, near six feet long and about three feet broad, out of which issues a constant flame of the colour and nature already described. When the wind blows it sometimes

rises to the height of eight feet, but is much lower in calm weather.

The earth round this place, for more than two miles, has this extraordinary property, that by taking up two or three inches of the surface, and applying a live coal to it, the part so uncovered immediately takes fire, almost before the coal touches the earth. The flame makes the soil hot, but does not consume it, nor affect what is near it with any degree of heat. It is said that eight horses were once consumed by this fire, being under a roof where the surface of the ground had been turned up, and by some accident had taken flame.

If a cane, or tube of paper, be set about two inches in the ground, closed with earth below, and the top of it touched with a live coal, a flame will immediately issue out without consuming the tube, provided the edges be covered with clay. Three or four of these lighted canes will boil water in a pot, and are sometimes used to cook victuals. The flames may be extinguished in the same manner as that of spirits of wine. It smells sulphurous, like naptha, but is not very offensive.—SMITH's *Wonders.*

BRIMSTONE MOUNTAINS.

THE mountains of Formosa, in India, are full of brimstone, which makes the island subject to earthquakes; and in the Philippine Islands there are several burning mountains, which have all the dreadful effects of Etna and Vesuvius, being attended with violent earthquakes, rending the very rocks, and scattering showers of ashes round the country. From these subterraneous fires proceed a great variety of hot baths, and some of their streams are said to be so hot as to kill any animal that happens to fall into them; but the water, when cool, is well tasted, and reckoned a wholesome beverage. About half a mile from one of these hot rivers is another excessive cold one, and yet esteemed equally wholesome with the former for common drinking. There is a volcano in the middle of the island of Sumatra, and Nieuhoff mentions several sulphurous springs issuing from the rocks, whose

water resembles oil, is good against lameness, and has a strong, though not unpleasant, smell. It is so much valued for its medicinal qualities, that we are told the King of Achen formerly prohibited the exportation of it on pain of death.

CAVES, CAVERNS, AND GROTTOS.

VERY REMARKABLE CAVERN

ON THE ISLAND OF HOONGA

On the island of Hoonga, in the South Pacific Ocean, is a peculiar cavern, situated on the western coast, the entrance to which is at least a fathom beneath the surface of the sea at low water, and was first discovered by a young chief whilst diving after a turtle. The nature of this cavern will be better understood if we imagine a hollow rock rising sixty feet or more above the surface of the water, into the cavity of which there is no known entrance but one, and that is on the side of the rock, as low down as six feet under the water, into which it flows, and consequently the base of the cavern may be said to be the sea itself. Finow, King of Hoonga, and his friends, being on this part of the island, proposed one afternoon, on a sudden thought, to go into this cavern and drink cava, (a liquor the natives are very partial to). Mr. Mariner, a gentleman many years a resident in the island, who related this story, was not with them at the time this proposal was made; but happening to come down a little while after to the shore, and seeing some of the young chiefs diving into the water one after another, was not a little surprised, and inquired of the last, who was just preparing to take the same step, what they were about? Follow me, said he, and I will take you where you have never been before, and where Finow, and his chiefs, and Matabooles, are now assembled. Mr. Mariner, supposing it to be the famous cavern of which he had heard some

account, prepared* himself to follow his companion, who dived into the water, and he after him, and, guided by the light reflected from his heels, entered the opening in the rock, and rose into the cavern. He was no sooner above the surface of the water than, sure enough, he heard the voices of the king and his friends. Being directed by his guide, he climbed up a jutting portion of rock, and sat down. All the light that came into this place was reflected from the bottom, and was sufficient, after remaining about five minutes, to show objects with some little distinctness; at least, he could discover, being directed by the voice, Finow and the rest of the company seated, like himself, round the cavern. Nevertheless, as it was desirable to have a stronger illumination, Mr. Mariner dived out again, and procuring his pistol, primed it well, tied plenty of gnatoo tight round it, and wrapped up the whole in a plantain leaf; he directed an attendant to bring a torch in the same way. Thus prepared, he re-entered the cavern as speedily as possible, unwrapped the gnatoo, a great portion of which was perfectly dry, fired it by the flash of the powder, and lighted the torch. The place was now illuminated tolerably well, for the first time since its existence. It appeared, by guess, to be about forty feet wide in the main part, but which branched off on one side in two narrow portions. The medium height seemed also to be about forty feet. The roof was hung with stalactites in a very curious way, resembling, upon a cursory view, the gothic arches and ornaments of an old church. After having examined the place, they drank cava, and passed away the time in conversation upon different subjects. Among other things, an old mataboole, after having mentioned how the cavern was first discovered, *viz.*, by a young chief in the act of diving after a turtle, related an interesting account of the use which this chief made of this accidental discovery. The circumstances are as follow:

* It is proper here to mention, that, in presence of a superior chief, it is considered very disrespectful to be undrest. Under such circumstances as the present, therefore, every one retires a little; and, as soon as he has divested himself of his usual dress, slips on an apron made of the leaves of the chi-tree, or of matting called gie. The same respect is shewn, if it is necessary, to undress near a chief's grave, because some katooa, or god, may be present.

In former times there lived a Tooi (Governor) of Vavaoo, who exercised a very tyrannical deportment toward his people. At length, when it was no longer to be borne, a certain chief meditated a plan of insurrection, and was resolved to free his countrymen from such odious slavery, or to sacrifice himself in the attempt. Being, however, treacherously deceived, by one of the party, the tyrant became acquainted with the plan, and immediately had him arrested. He was condemned to be taken out to sea and drowned, and all his family and relations were ordered to be massacred, that none of his race might remain. One of his daughters, a beautiful girl, young and interesting, had been reserved to be the wife of a chief of considerable rank; and she too would have sunk, the victim of a merciless destroyer, had it not been for the generous exertions of another young chief, who, a short time before, had discovered the cavern of Hoonga. This discovery he had kept within his breast a profound secret, reserving it as a place of retreat for himself, in case he should be unsuccessful in a plan of revolt which he also had in view. He had long been enamoured of this beautiful young maiden, but had never dared to make her acquainted with the soft emotions of his heart, knowing that she was betrothed to a chief of higher rank and greater power. But now the dreadful moment arrived when she was about to be cruelly sacrificed to the rancour of a man, to whom she was almost a deadly enemy. No time was to be lost: he flew to her abode, communicated in a few short words the decree of the tyrant, declared himself her deliverer, if she would trust to his honour; and, with eyes speaking the most tender affections, he waited with breathless expectation for an answer. Soon her consenting hand was clasped in his; the shades of evening favoured their escape; whilst the wood, the covert, or the grove, afforded her concealment, till her lover had brought a small canoe to a lonely part of the beach. In this they speedily embarked, and, as he paddled across the smooth wave, he related his discovery of the cavern destined to be her asylum, till an opportunity offered of conveying her to the Fiji islands. She who had intrusted her personal safety entirely to his care, hesitated not to consent to whatever plan he might think promotive of

their ultimate escape: her heart being full of gratitude, love, and confidence, found an easy access. They soon arrived at the rock, he leaped into the water, and she, instructed by him, followed close after. They rose into the cavern, and rested from their fears and fatigue, partaking of some refreshment which he had brought there for himself, little thinking at the time of the happiness that was in store for him.

Early in the morning he returned to Vavaoo, to avoid suspicion; but did not fail, in the course of the day, to repair again to the place which held all that was dear to him: he brought her mats to lie on, the finest gnatoo for a change of dress, the best of food for her support, sandal-wood oil, cocoa-nuts, and every thing he could think of, to render her life as comfortable as possible. He gave her as much of his company as prudence would allow, and at the most appropriate times, lest the prying eye of curiosity should find out his retreat. He pleaded his tale of love with the most impassioned eloquence, half of which would have been sufficient to have won her warmest affections, for she owed her life to his prompt and generous exertions at the risk of his own: and how was he delighted, when he heard the confession from her own lips, that she had long regarded him with a favourable eye, but a sense of duty had caused her to smother the growing fondness, till the late sad misfortune of her family, and the circumstances attending her escape, had revived all her latent affections, to bestow them wholly upon a man to whom they were so justly due. How happy were they in this solitary retreat! tyrannic power now no longer reached them: shut out from the world and all its cares and perplexities; secure from all the eventful changes attending upon greatness, cruelty, and ambition; themselves were the only powers they served, and they were infinitely delighted with this simple form of government. But although this asylum was their great security in their happiest moments, they could not always enjoy each other's company; it was equally necessary to their safety, that he should be often absent from her, and frequently for a length of time together, lest his conduct should be watched. The young chief therefore panted for an opportunity to convey her to happier scenes, where his ardent

imagination pictured to him the means of procuring for her every enjoyment and comfort which her amiable qualifications so well entitled her to: nor was it a great while before an opportunity offering, he devised the means of restoring her with safety to the cheerful light of day. He signified to his inferior chief and matabooles, that it was his intention to go to the Friji islands, and he wished them to accompany him with their wives and female attendants, but he desired them on no account to mention to the latter the place of their destination, lest they should inadvertently betray their intention, and the governing chief prevent their departure. A large canoe was soon got ready, and every necessary preparation made for their voyage. As they were on the point of their departure, they asked him if he would take a Tonga wife with him. He replied, no; but that he should probably find one by the way: this they thought a joke, but, in obedience to his orders, they said no more, and, every body being on board, they put to sea.

As they approached the shores of Hoonga, he directed them to steer to such a point, and, having approached close to a rock, according to his orders, he got up and desired them to wait there, while he went into the sea to fetch his wife; and without staying to be asked any questions, he sprung into the water from that side of the canoe farthest from the rock, swam under the canoe, and proceeded forward into the sanctuary which had so well concealed his greatest and dearest treasure. Every body on board was greatly surprised at his strange conduct, and began to think him insane; and after a little lapse of time, not seeing him come up, they were greatly alarmed for his safety, imagining that a shark must have seized him. Whilst they were all in the greatest concern, debating what was best to be done, whether they ought to dive down after him, or wait according to his orders, for that perhaps he had only swam round and was come up in some niche of the rock, intending to surprise them; their wonder was increased beyond all powers of expression, when they saw him rise to the surface of the water, and come into the canoe with a beautiful female. At first they mistook her for a goddess, and their astonishment was not lessened when they recognised her countenance, and found

her to be a person whom they had no doubt was killed in the general massacre of her family: and this they thought must be her apparition. But how agreeably was their wonder softened down into the most interesting feelings, when the young chief related to them the discovery of the cavern, and the whole circumstance of her escape. All the young men on board could not refrain envying him his happiness in the possession of so lovely and interesting a creature. They soon after arrived at one of the Friji islands, and resided with a chief for two years; at the end of which time, hearing of the death of the tyrant of Vavaoo, the young chief returned with his wife to the last-mentioned island, and lived long in peace and happiness.—MARINER'S *Account of the Tonga Islands.*

GROTTO OF ANTIPAROS.

THE island of Antiparos, in the Archipelago, is celebrated for a remarkable cavern or grotto, of great extent. Whether or not the grotto of Antiparos, as it is now termed, was known to the ancients, is doubtful. There are two inscriptions on natural pillars at the mouth, bearing the names of several Greeks, whose names are found in history; and a tradition prevails among the inhabitants, that they were the conspirators against Alexander the Great, who, having failed in their design, took refuge here. As the name of Antipater is among them, this circumstance is thought to give probability to the tradition, because Diodorus Siculus alleges, that certain historians had accused him of participating in the conspiracy. These inscriptions were much obliterated even a century ago. Near them is a bas-relief of a cross also defaced, which belongs to a later period. If the ancients were truly acquainted with the recesses of the cavern, the natives of the island had either lost all knowledge of it, or were afraid to enter, until the time of Magni, an Italian traveller, who is thought to have first penetrated the interior, in the seventeenth century. It was more recently visited by M. Tournefort, afterwards by several Englishmen, and then by M. Choiseul Gouffier, who gives exact details of its description, size, and structure. The entrance

is by a low arch in the rocks, about thirty paces wide, which is divided into two portions by several natural pillars. To one of these a rope is fixed, to assist the traveller in his descent, and to facilitate his return. First there is found a small flat space, which advances in descents of various steepness, some of which are extremely slippery, owing to the moisture exuding from the rocks, until nearly half way down, when the gentleness of the inclination renders it unnecessary either to use a ladder, as is before done, or to hold by a rope.

The following particular account of this remarkable grotto, as related by an eminent traveller a few years since, we cannot resist inserting for the entertainment of our readers.

"The entrance," says the writer, "lies on the side of a rock, about two miles from the sea-shore, and is a very large arch, formed of rough craggy rocks, overhung with brambles and climbing plants, that give it an air of awful gloominess. Our surgeon, myself, and four other persons, attended by six guides with lighted torches, entered this cavern about eight o'clock in the morning, in the middle of August. We had not proceeded twenty yards when we lost all sight of day-light; but the roof and sides of the alley, through which we were passing, glittered like diamonds by the reflection of our torches. At the end of this passage we were presented with ropes to tie about our middles, which when we had done, our guides led us to the brink of a most terrific precipice. The dreadful depth of this place, and the horror of a descent through a miserable darkness, made me look back to the lane of diamonds we had just passed; but the hope of seeing something curious at the end of my journey tempted me to lower myself down by a rope as the guides directed. After reaching the bottom, and congratulating my friends on our safe descent, I inquired for the Grotto; but our guides told us we had a great way to go yet; and they immediately led us forward, under a ridge of rugged rocks, to the brink of another precipice, much deeper and more terrible than the former. Two of the guides now preceded us with torches; and by their light we could discern that this passage was not so perpendicular as the other, but lay in a deep slant, with a very slippery rock for the bottom,

wet pieces of rock jutting out on one side in the descent, and forcing the guides sometimes to creep under, sometimes to climb over, and at other times to go quite round them, whilst a series of dark caverns, like so many monstrous wells, yawned on the opposite side, ready, if a man should slip, to swallow him up for ever.

"We stood some time on the edge, to watch the motions of our guides; and were equally amazed and terrified to see them descend before us until they seemed at a most frightful depth. On their calling to us from the bottom, we began to descend after them; but we had not gone thirty feet down, when we came to a place where the rock was perfectly perpendicular, and a vast cavern seemed ready to swallow us on one side, while a wall of rugged rock threatened to crush us on the other. At this terrible prospect I was quite disheartened, and declared I would proceed no further; but as the guides assured us there was no danger, and my companions resolved to see the bottom, I proceeded to a corner where was placed an old ladder, and by this we all descended.

"Having surmounted this difficulty, we found another at the entrance of another passage, which, as we slid down, appeared to be about nine feet high, and seven wide, and to have for its bottom a green glossy marble. The walls and arched roof being as smooth as if wrought by art, and composed of a glittering red and white granite, supported with red porphyry, made a most splendid appearance. When we entered this passage, I expected that we should, at the bottom, join the two guides we had first set down, but alas! when we got there, we found ourselves at the mouth of another precipice, which we descended by a second ladder, not much better than the former. The dread of falling employed all my thoughts during this descent; but I observed, as my companions were coming down after me, that the wall to which the ladder was fastened, was a solid mass of red marble, covered with white sprigs of rock crystal, and making, with the glow of the purple from behind, one immense sheet of amethysts.

"After sliding about twenty feet, through another shallow vault of green and white marble, and refreshing ourselves with a little rum, we proceeded through a slanting

passage of rough coarse stone, full of figures of snakes rolled round, and seemingly alive; but in reality as cold and hard as the rest of the stone. When we had walked about two hundred yards down this descent, we saw two beautiful pillars, of a glittering yellow marble, which seemed formed to support the roof; and soon afterwards we descended another precipice, which the guides assured us was the last.

"At the bottom of this precipice we found ourselves, for some way, upon plain even ground; but after walking about forty yards, we entered an alley, the sides and roof of which were entirely composed of black stone, and the rocks were in some places so steep and rugged, that we were forced to slide down on our backs, and were bruised miserably in passing. Over our heads were nothing but dismal rocks, some of which threatened to fall in upon us and the light of the guides' torches only served to shew the surfaces of some dirty lakes of water.

"If I had repented of my expedition before, I now gave myself over for lost; bitterly accusing all the travellers who had given such a description of the place as excited people's curiosity, without warning them of the horrors that lay in the way. In the midst of these sad reflections, we lost four of our guides, and as the place was now much darker for want of their torches, I expected to follow them into some of those lakes, where I supposed they had inevitably perished, although the two remaining guides assured us that we should soon meet their companions again, and that we were very near the end of our journey.

"Our passage was now become extremely narrow, and we were obliged to crawl on our hands and knees over the rugged rocks, when, in an instant, I heard a hissing noise, and found myself in total darkness. The guides told us they had accidentally dropped their torches in a puddle of water, but exhorted us to crawl forward, and told us there was no danger. I was, indeed, astonished at the courage of these men in a place where I thought four of them had already perished; but as I thought it impossible for any of us to escape from our present situation, I determined to lie down and die where I was. One of the guides, however, immediately came up to me, and, clapping his hand firmly on my eyes, dragged me a few

paces forward. Whilst I was in this strange situation, expecting death in a thousand shapes, and trembling at the rough behaviour of my conductor, he suddenly lifted me over a great stone, sat me on my feet, and removed his hand from my eyes. But what language can express my transport and astonishment at that moment, when, instead of darkness and despair, all was splendour and magnificence before me! My friends all appeared about me; the place was illuminated by fifty torches, and all the guides welcomed me into the Grotto of Antiparos. I now found that the four men whom I had deemed lost, had given us the slip, in order to get the torches lighted before we came; and the other two had wilfully put out their lights, that we might enter out of utter darkness into this pavilion of splendour and glory.

"The grotto in which we now were, is 120 yards wide, and 113 long, and about 60 yards high. These dimensions are somewhat different from those which travellers have generally presented to the public; but they are certainly accurate; for I took them with my own hand. Imagine then, an immense arch like this, lined with crystallized white marble, and illuminated by fifty torches, and you will have some idea of the place in which I spent three hours.

"The roof, which is a fine vaulted arch, is hung all over with icicles of white marble, some of them ten feet long, and as thick as a man's waist: and from these depend a thousand festoons of leaves and flowers of the same substance, but so extremely glittering, that it is impossible to look upon them without dazzling one's eyes. The sides of the arch seem planted with trees of white marble, rising in rows above each other; from these are hung beautiful festoons, tied as it were, from one to another, in prodigious quantities; and in some places there actually seem to be rivers of marble, winding in a thousand elegant meanders. All these things have been made, in a long course of years, by the dropping of water, but they really look like trees and brooks transformed to marble.

"The floor was rough and uneven, with red, blue, green, and yellow crystals growing out of it in an irregular manner: these were all shaped like pieces of saltpetre, but so hard that they cut our shoes; and among them are

placed icicles, or small pillars of white shining marble, to each of which our guides fastened two or three torches. All round the sides of the arch are white masses of marble, in the shape of oak-trees, and sufficiently large, in many places, to enclose a piece of ground big enough for a bed-chamber. One of these chambers has a beautiful curtain, whiter than satin, of the same marble, stretching entirely over the front, on which we all cut our names, and the date of our visit, as many other persons had done before us.

"Most of the columns thus formed in the grotto of Antiparos have been injured by the indiscreet curiosity of travellers, either for the purpose of examining their internal organization, or of enriching their cabinets. But new ones would continually be completed, were the portions approaching towards each other left untouched.

"In the midst of what is called the *hall*, which is the greatest vacuity of the grotto, there is an immense stalagmite, about 20 feet in diameter, and 24 in height. This superb concretion has been denominated the *altar*, ever since the Marquis de Nointel celebrated a midnight mass, during his visit to the cavern in 1673; an event which is perpetuated by an inscription on a rock near its entrance, still entire. That nobleman, who was ambassador from Louis XIV., of France, to the Ottoman Porte, passed the three festivals of Noel in the grotto, attended by above 500 persons, consisting of those in his own train, merchants, corsairs, and the people of the country who followed him. Men were posted from the extremity to the entrance, to communicate the moment when the host was elevated to those without, who discharged their fire-arms, and sounded trumpets and other musical instruments, to render the consecration more impressive. The grotto itself was illuminated by 100 large torches of yellow wax, and 400 lamps burned in it day and night. The whole ceremony being ended, he ordered an inscription to be engraved on the base of the concretion, intimating that at midnight of Christmas, 1763, he had celebrated mass.

"It is not absolutely certain whether the utmost extremity of the cavern has ever been attained. The inhabitants of Antiparos affirm that it reaches below the sea, and that a goat having accidentally wandered into it, was

found in the island of Nio, between 30 and 40 miles distant. But although this is most likely a fabulous report, it is not improbable that many recesses yet remain to be explored."—*Edinburgh Encyclopedia, and* SMITH's *Wonders.*

REMARKABLE CAVE IN PENNSYLVANIA.

AT Swetara, in Pennsylvania, is a remarkable cave on the East bank of Swetara river, about two miles above its confluence with the Susquehannah. Its entrance is very spacious, and descends so much, that the surface of the river is rather higher than the bottom of the cavern. The vault of this cave is of solid limestone rock, about 20 feet thick. It contains several apartments, some of which are very spacious and lofty. Water is incessantly distilling through the roof, and falls in drops to the bottom of the cave; these drops petrify as they fall, and have gradually formed solid pillars, which seem to support the roof. Some years ago there were ten such pillars six inches in diameter, and six feet high, all so ranged, that the place they enclosed resembled a sanctuary in a Romish church.—No royal throne, says Dr. Morse, ever exhibited more grandeur than this *lusus Naturæ.* The resemblances of several monuments are found indented on the sides of the cave which appear like the tombs of departed heroes. Suspended from the roof is *the bell,* which is nothing more than a stone projected in an unusual form, so called from the sound it occasions when struck, which is similar to that of a bell.—SMITH's *Wonders.*

ELDEN HOLE.

ELDEN HOLE, one of the principal wonders of the Peak of Derbyshire, was formerly represented as perfectly unfathomable, and teeming, at a certain depth, with such noxious air, that no person nor animal could respire it without inevitable destruction. Cotton affirmed, more than a century ago, that he let down 884 yards of line,

of which the last 80 yards were wet, without finding a bottom; and it has been confidently asserted that a poor man was once lowered down in a basket, to the depth of two hundred yards, and that, on being drawn up again, he died in a state of delirium.

In the 61st volume of the *Philosophical Transactions*, however, is the account of a descent made into this excavation by a Mr. Lloyd, who relates, that, for the first sixty feet, he descended somewhat obliquely, and that the passage then became difficult from craggy projections of the sides. At the depth of thirty feet more the inflection of his rope varied very considerably from the perpendicular; and, after passing through a damp moss-grown chink, about three yards broad, the rock opened on the east, and he swung till he reached the bottom of the cave, which was only 62 yards from the mouth. From the description given by this gentleman, it appears that the interior of this chasm consists of two parts: one like an oven, and the other like the dome of a glass-house, communicating with each other by a small vaulted passage. On the south side of the second cave is a smaller opening, about twelve feet long and six feet high, lined throughout with a kind of stalactite of a fine yellow colour; and opposite to the first entrance is a column of similar incrustation, 90 feet high. After climbing up a rocky ascent, and descending with great difficulty toward the north, Mr. Lloyd discovered a small cavern open into the side of the vault, the roof of which was adorned with a prodigious number of pendent stalactites. The sides of the largest opening are said to be lined with incrustations of three kinds; the first a deep yellow stalactite; the second a thin coating, resembling a light stone-coloured varnish; and the third, a rough efflorescence, the shoot of which bears the similitude of a kind of rose-flower. The assertions of several miners who have been questioned respecting the depth of this cavern, correspond as nearly as possible with the account given by Mr. Lloyd; so that the former tales of its being utterly fathomless, *&c.*, must have resulted from the unskilfulness of the persons who undertook to plumb it, or from some other gross mistake.—SMITH'S *Wonders.*

POOLE'S HOLE.

Poole's Hole, said to have derived its name from a notorious robber, who secreted himself here from justice, is a stupendous cavern at the foot of a mountain near Buxton. The entrance is extremely low and narrow; but it gradually opens into a spacious and lofty concavity, like the interior of a Gothic cathedral. In a cavern to the right, called Poole's chamber, is a curious echo, and the sound of a rapid stream which runs through the great vault produces a fine effect. The innumerable drops of water which depend from the roof and sides are also worthy of admiration, for they not only reflect innumerable rays from the lights carried by the guides, but, being of a petrifying quality, they form many fanciful resemblances of men, lions, dogs, and other animals, and of organs, lanterns, and flitches of bacon. The Queen of Scots' pillar, said to have taken its name from a visit of the unfortunate Mary, during her abode at Chatsworth, is clear and bright like alabaster, but probably partakes more of the nature of spar, with which the circumjacent country abounds. This pillar is the boundary of most people's curiosity; but there is a steep ascent for nearly a quarter of a mile beyond it, which terminates in a hollow in the roof, called the needle's eye, where a candle, if judiciously placed, appears like a star from a cloudy sky.—Smith's *Wonders.*

DEVIL'S HOLE.

The entrance to another cavern, called the Devil's Hole, is extremely magnificent, being situated in a gloomy recess, between two ranges of perpendicular rocks; and having on the left a rivulet, which issues from the cave, and pursues its foaming course over craggy and broken masses of lime-stone. A vast canopy of rock forms the mouth of this stupendous excavation, and assumes the appearance of a depressed arch, which extends 120 feet in width, 42 in height, and about 90 in receding depth.

At the first entrance, a spectator is surprised to find that a number of twine-makers have established their

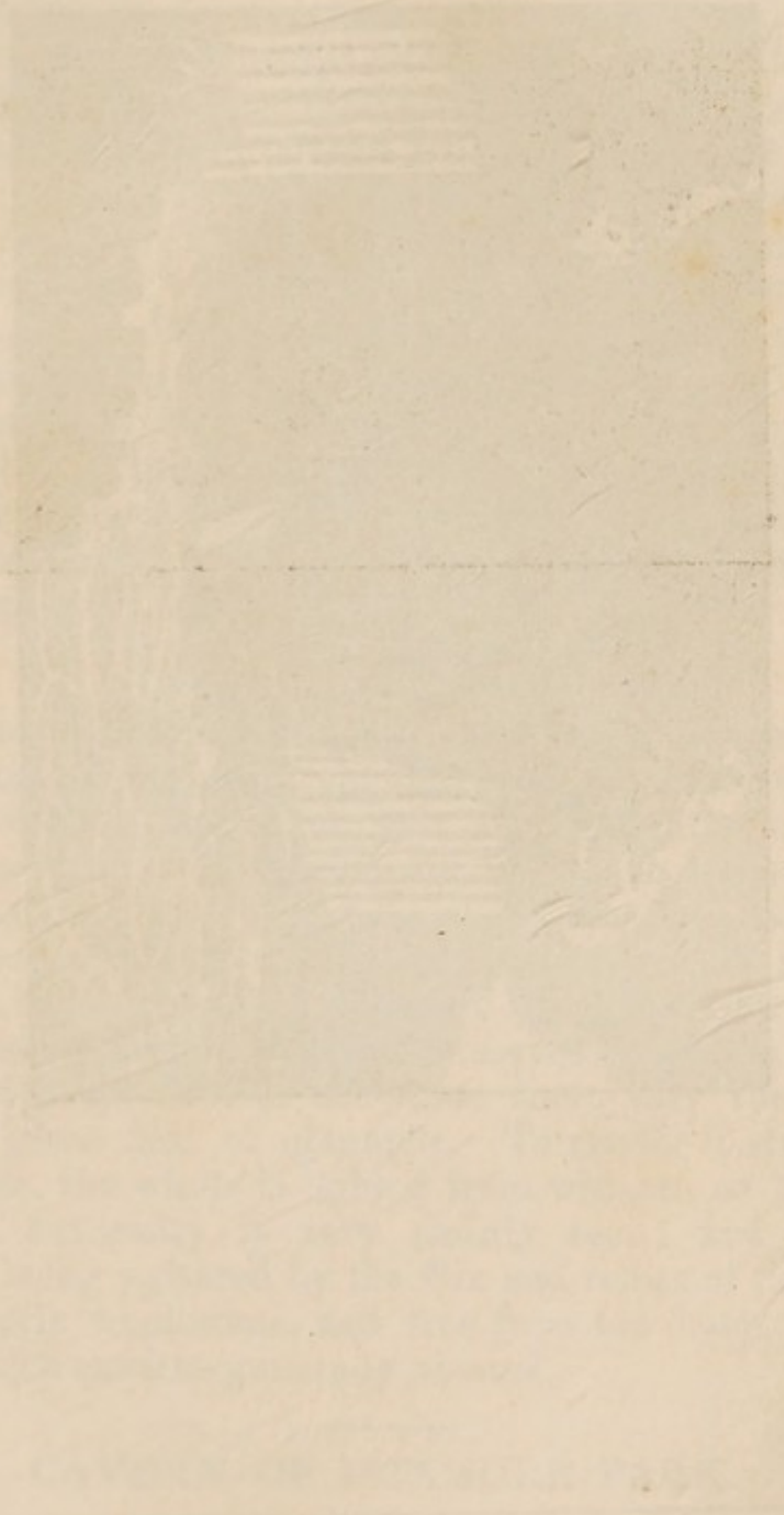
residence and manufactory within this tremendous gulf; and the combinations of their rude appearance and machines with the sublime features of the natural scenery impresses the mind with an indescribable emotion of awe. After proceeding about 90 feet, the roof becomes lower, and a gentle descent conducts, by a detached rock, to the interior entrance, where the blaze of the day wholly disappears, and all further researches must be pursued by torch-light.

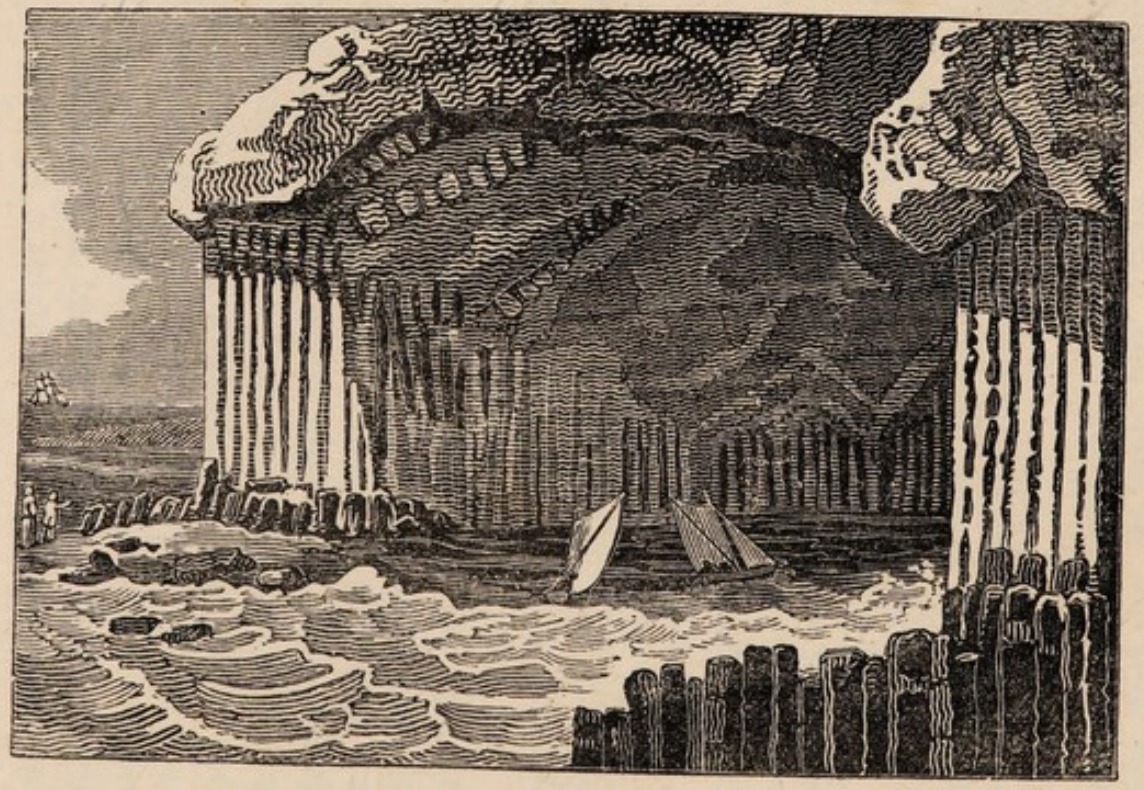
The passage now becomes extremely confined, and the visitor is obliged to proceed about twenty yards in a stooping posture; but, on his arrival at a spacious opening, called the bell-house, he is again enabled to stand upright, and proceeds without inconvenience to the brink of a lake, where a small boat is ready to convey him to the interior of the cavern, beneath a massive rock, which stoops within twenty inches of the surface of the water.

Beyond this lake is a spacious vacuity, about 220 feet long, 200 broad, and, in some parts, 120 feet high; but, from the want of light, neither the roof nor distant sides of this vast abyss can be plainly discerned.

Near the termination of a shallow stream, called the Second Water, is a projecting pile of rocks, called Roger Rain's House, from the circumstance of water incessantly dripping from the crevices of the roof. Beyond this opens another tremendous hollow, called the Chancel, where the rocks appear much broken, and the sides are literally covered with stalactical incrustations. Here the stranger is generally surprised by an invisible vocal concert, which bursts in discordant tones from the upper region of the chasm. Yet, says a respectable tourist, being unexpected, and issuing from a quarter where no object can be seen, in a place where all is still as death, and calculated to impress the imagination with solemn ideas, it can seldom be heard without that mingled emotion of awe and pleasure, astonishment and delight, which is one of the most interesting feelings of the mind. At the conclusion of the strain, the choristers (consisting of eight or ten women and children) are seen ranged in a hollow of the rock, about fifty feet above the floor.

After passing the Devil's Cellar, and the Half-way House, (neither of which are particularly worthy of





CAVE OF FINGAL.

observation,) the visitor proceeds beneath three natural arches to a vast concavity, which, from its resemblance to a bell, is called Great Tom of Lincoln. From this point the vault gradually descends, the passage contracts, and at length leaves no more room than is sufficient for the passage of the stream, which continues to flow through a subterraneous channel.

The entire length of this wonderful cavern is 2,250 feet, and its depth, from the surface of the mountain, about 620. A curious effect is produced by the explosion of a small quantity of gunpowder, wedged into the rock in the interior of this cave; for the sound appears to roll along the roofs and sides, like a tremendous and continued peal of thunder. The effect of the light, on returning from these dark recesses, is particularly impressive, and the gradual illumination of the rocks, which becomes brighter as we approach the entrance, is said to exhibit one of the most interesting scenes that ever employed the pencil of an artist, or fixed the admiration of a spectator.—SMITH'S *Wonders.*

CAVE OF FINGAL

THE cave of Fingal, in the island of Staffa, is probably one of the most magnificent that has ever been described by travellers. The mind, says Mr. Pennant, can hardly form an idea more magnificent than such a space, supported on each side by ranges of columns, and roofed by the bottom of those which have been broken off in order to form it, between the angles of which a yellow stalagmetic matter has exuded, which serves to define the angles precisely, and, at the same time, vary the colour with a great deal of elegance. To render it still more agreeable, the whole is lighted from without, so that the farthest extremity is very plainly seen; and the air within, being agitated by the flux and reflux of the tides, is perfectly wholesome, and free from the damp vapours with which caverns generally abound.

CAVERN OF DUNMORE PARK.

THE cavern of Dunmore Park, near Kilkenny, in Ireland, descends about ninety feet perpendicularly from the summit of a small hill, through an opening of forty yards

in diameter. The sides are composed of lime-stone, and occasionally feathered with shrubs. When the inspector has descended to the bottom, he sees one side of the pit supported by a natural arch, about twenty-five yards wide, and, at the same time, perceives two subterraneous openings to the right and left. If he turn to the right, he must make his way over several rugged rocks, which are incrusted with spar, in the most whimsical shapes, and variegated with the wildest assemblage of colouring. Many icicle-shaped cones depend from the roof, and having, in many parts, met the rising stalactites, form a number of fantastic appearances, like the pillars of a Gothic cathedral, organs, crosses, &c.

Mr. Adam Walker, in a letter to Dr. Morton, secretary to the Royal Society, has made the following observations on this remarkable place: The scene is, indeed, both pleasing and awful; the candles, burning dim from the moisture of the air, just served to show a spangled roof, perpetually varnished with water, and, in some places, upwards of 20 yards high. In other parts we crawled on all-fours, through cells that will admit but one person at a time. After having scrambled about 500 yards through the right side of the cave, we returned to day-light, and proceeded to view the left side. This branch is not so horizontal as the other; it inclines downwards, and the openings are much larger, some being upwards of a hundred yards wide, and above fifty yards high. In a standing part of a brook, near a quarter of a mile from the entrance, we found a great number of human bones, some of which were very large; but, when taken out of the water, they crumbled away. As we could find nothing like an inscription or earth for a burying place, we conjectured that some of the civil wars might have driven the owners of these bones to this melancholy retreat.

Many of the rocks in the sides and roof of the cavern are black marble, prettily diversified with white spots; and the circumjacent country abounds with quarries of this beautiful stone, which takes a fine polish, and is frequently used for slabs and chimney-pieces.—SMITH'S *Wonders.*

BLOWING CAVES.

At a place called Panther-Gap, in Virginia, is what is called the blowing cave, which is of about a hundred feet diameter, and constantly emits a current of air, with such force as to keep the weeds prostrate to the distance of twenty yards before it. This current is strongest in the frosty weather, and in long spells of rain weakest. There is another blowing cave in the Cumberland mountain; but all that is known of this is, that it is inconstant, and that a fountain of water issues from it.—Smith's *Wonders.*

LA GRAND CHARTREUSE.

No traveller of taste will, we are persuaded, think of quitting Grenoble without visiting this ancient monastery, particularly as the road to it has been pronounced by Gray as one of the most solemn, most romantic, and most astonishing, scenes he ever beheld. Several routes lead to the Chartreuse: but the most frequented one is that of St. Laurent du Pont. This leaves the high road and the valley of the Isore at Voreppe, and enters a defile between two mountains, which runs three leagues to the northward. Five or six torrents of water, which have formed the valleys through which they flow, must be passed, but not without some danger, before we arrive at the village of St. Laurent, where the heads of the order commonly stop in their carriages when they go to hold a chapter once a year at La Grand Chartreuse. Here the danger of passing the first torrents is at an end, but then that of the narrow roads hanging over other torrents, like the cornice of a lofty building, commences. Those who have seen the falling of cascades at a distance, have an opportunity now of being close to them. Here is no longer a confused noise heard a great way off, but a continued roar and a noise that drowns all others, and does not permit the bird to hear his own song, nor the travellers to be delighted with it. At length the valley closes, as it were all at once, the two mountains meet, and their summits are lost in the clouds. On each side, however, the dreadful steeps present thorns, firs, rocks, &c., traversed by the torrents,

and forming a barrier equally as inaccessible to those who might wish to penetrate into this retreat, as to those who would leave it by any other issue than this. One house, built over an open archway, partly closed on each side by a gate, occupies the whole breadth of this passage. But, after having passed the torrent, over a dangerous bridge, thrown from one mountain to the other, it is necessary to pass under the house with its back to the right against the mountain, and upon the left suspended over an abyss. Having passed this double gate, we find ourselves in the close of the Chartreuse, composed of a group of the highest mountains, the steepest and the wildest of the whole chain. Here the forests of firs that cover them from the base to the summit, the frowning rocks and torrents, are the only embellishments which supply the place of smiling meadows, orchards, and plantations. In traversing these astonishing regions we involuntarily exclaim with the poet who visited these sublime scenes,

Oh tu, severi Religio loci,
Quocunque gaudes nomini non levi;
Nativa nam certò fluenta
Numen habet, veteresque sylvas.

Præsentiorem et conspicimus Deum
Per invias rupes, fera per juga,
Clivosque præruptos, sonantes
Inter aquas, nemorumque noctem.

Ode written in the album of the Grande Chartreuse August, 1741.

IMITATED.

Hear, awful genius of the solemn grove,
And say what title best can please thine ear;
Those age-struck woods, and native rivers prove,
No common genius bears dominion here.

The trackless rocks, the mountain's savage height,
The broken cliff, inviting fell despair;
The deep-brown grove, where reigns eternal night,
And sounding waterfalls, the god declare.

Continuing our walk about an hour towards the left, following the torrent of *Guier vif*, which falls into *Guier mort*, and forms the river *des Eschelles*, we hear the noise of the water against the rocks which obstruct the passage, but only see it at intervals through the umbrageous foliage, and running along a frightful abyss, into which one false step might precipitate us. All at once we then come upon a cascade, which falls down into the middle of the road from the summit of the mountain on the right. The horses may take fright, but there is no other passage; we must either venture directly under the cascade, whose volume is sufficient to crush the horse and his rider, or actually pass within the space of two or three feet between the precipice and the cascade, under the shower which it diffuses, and through the rapid current which it forms in the road. If the horse should be frightened, and should start too far to the left, he would fall into the torrent which runs in a bottom beneath this place, at a depth of more than 400 perpendicular feet.

When the snows melt, the danger of the torrent is very great; but it is not so in summer, when pilgrimages are generally made, unless the torrents have been swollen by great storms. We still advance through the obscurity of the forest, the mountain on the right, and the torrent on the left, till we come to the second bridge, the ancient entrance of the Chartreuse. This bridge passed, we cross the opposite bank, and then have not more than half a league of the forest to traverse before we arrive at the convent. The same dreary scenes, the same lofty rocks and precipices, the same umbrageous gloom, still continue. We still go on ascending; and the mountains seem to rise in proportion. However, the coolness we enjoy here, even in the heat of summer, is always delightful. At length the valley widens, and the darkness of the forest begins to disappear. The spreading beech now takes place of the tall fir, which is only seen crowning the heights. Already the monastery appears, shining through the opening foliage of the trees. Soon the forest terminates, and we find ourselves in a vast meadow, and at its extremity the eye may measure a part of that desert of which this edifice forms the centre. The stupendous rocks which enclose it on every side reach far above the clouds,

which mostly indeed rest upon their summits: here they form a dense shade, which, like a dark awning, completely conceals the sun from the view. Were not this the case, the fierce reflections of its beams would be almost insupportable. Even on the brightest day, the sun is only visible (owing to the proximity of the rocks) as from the bottom of a deep well. On the west, indeed, there is a little space, which being thus sheltered, is occupied by a dark grove of pine-trees; on every other side, the steep rocks, like so many walls, are not ten yards distant from the convent. By this means, a dim and gloomy twilight perpetually reigns within; and it is difficult to read small print by lamp-light, even in the noon of the brightest summer's day. The architecture of this building, which cost more than a million, is noble, simple, and solid. The meadow that is before the Chartreuse is bounded by the forest which covers the whole of this elevated region. The façade is embellished by the gardens and terraces belonging to the ancient officers of the house. In the interior we visit the apartments of the strangers, the spacious cellars, and the dairy, where they make a kind of *gruyère*, or Swiss cheese. The tables in the kitchen are formed of two slabs of rough marble. The hall of the chapter, still embellished with the portraits of all the heads of the order, is one of the principal objects of curiosity; the extent of the cloister is very striking. It contains eighty cells.

This convent was not sold during the French revolution, because no purchaser could be found for it, and being situated in a kind of desert, its demolition would have been of no advantage.

The riches of this monastery were considerable, but their possessions were not envied, because they received a great number of strangers*, distributed many alms, and

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* Mr. Gray thus describes his reception there in 1739:—The two fathers, who are commissioned to entertain strangers (for the rest must neither speak to one another, nor any one else) received us very kindly; and set before us a repast of dried fish, eggs, butter, and fruit, all excellent in their kind, and extremely neat. They pressed us to spend the night there, and to stay some days with them; but this we could not do, so they led us about the house, which is like a little city; for there are 100 fathers, besides 300

maintained a prodigious number of people all the year round. Besides, opulence had not introduced corruption within these walls. The primitive purity of cloistered virtue was still to be found here, and the rules of the order were rigidly observed: the Chartreuse had been its cradle, and it continued to be its example.

The following are some of the regulations which were formerly strictly observed in this monastery:—Each member of the community had a cell, with a little garden adjoining. In this cell he ate, slept, and worked, except during the hours of out-door exercise, which each passed in cultivating his own little garden. By this means the recluses, however numerous, had no communication with each other. They never saw each other, but in the hour of public service, excepting on a Sunday, when they were allowed to go to the proper officer, who gave them their portions of food for the week. Every one cooked his provisions in his own cell.

Their only sustinence is a coarse brown bread and vegetables. They are likewise allowed to receive fish, whenever it is given them. In case of illness, they are allowed two spoonsful of wine to a pint of water. On high festivals they are allowed cheese. The cells are provided with water by a brook, which runs close by, and which enters the cells by holes left in the walls for that purpose. They always wear hair-cloth next the skin. Whenever it is necessary to make any communications to their brethren, they do it by signs, if possible. Every cell is furnished with skins of parchment, pens, ink, and colours: and each one employs himself, for a certain time every day, in writing or transcribing. No one is admitted to take the vows till the age of twenty*.

To arrive at the *cell of St. Bruno*, the founder of the Chartreuse, we follow a torrent, by a broad and shady path, for about a quarter of an hour; this cell has been converted

servants, that make their clothes, grind their corn, press their wine, and do every thing among themselves. The whole is quite orderly and simple; nothing of finery, but the wonderful decency, and the strange situation, more than supply the place of it.—Works, vol. i p. 202, 8vo.

* See the interesting "Tour to la Grande Chartreuse and Alet," by Dom. Claude Lanulot, 8vo., 1813.

into a chapel; and in a grotto beneath it a spring is still running, at which St. Bruno used to quench his thirst. Never was an asylum better chosen; on approaching this peaceable and profound solitude, we seem to feel a peculiar repose of the soul; a state of mind which silences all our tumultuous passions:

Here Solitude and Silence reign,
With all the Virtues in their train;
Here, Contemplation, nymph serene,
With gentle step and placid mein,
With saints and confessors of old,
High sacred converse seems to hold;
Here Piety, with up-cast eyes,
Dissolves in holy ecstasies:
And scorning aught of this vile earth,
That Heaven seeks that gave her birth;
Here Charity, above the rest,
E'en in the desert spreads a feast.

The above is part of the Latin ode before quoted, by Mr. Seward, the anecdotist, printed in the *European Magazine* for 1791.—Coxe's *Guide through France.*

THE LATOMIÆ, OR EAR OF DIONYSIUS.

Near the theatre at Syracuse is one of the Latomiæ, or quarries, excavated by the Athenians, who were made prisoners at the battle that occurred about the year 413 B. C. These spacious and extensive Latomiæ, of which there are several in Syracuse, were in all probability undertaken more for the stone, which was then absolutely necessary to carrying on the vast and magnificent buildings erecting in the city, than as a place of confinement; but in after times, they were converted into prisons. This particular one is about three quarters of a mile in circumference, and is excavated to the depth of about 120 feet below the level of the adjoining ground; it is now converted into a garden, and presents a most luxuriant appearance: here we observed the deep crimson blossom of the pomegranate, and the bright yellow of the Indian fig,

elegantly intermingled with the vine and the orange; in fact, the inhabitants of Syracuse call this lovely spot their paradise. Within this Latomiæ are many subterraneous grottos likewise dug out of the living rock, the principal of which, from the particular elevation of the entrance, conjointly with the name of the tyrant, who originally caused its formation, is generally known by the appellation of Dionysius; the peasants, however, of the neighbourhood, from its possessing a very strong echo, generally call it the Speaking Grotto. The peculiar form and picturesque effect of these singular caves would render them no less agreeable than curious and interesting, if we could forget the dreadful evils which formerly took place within them; if we could forget the ponderous chains, the inhuman tortures, and the cruel tyranny of Dionysius, who not only behaved in the most cruel and barbarous manner to prisoners of war confined within them, but also to such of his subjects as were so unfortunate as to awaken his suspicion.

Our attention in the first place was directed to the formation of its plan, which is here introduced, in order to present a more correct idea of the form than it would be possible to convey by words.

This grotto is about 170 feet in depth, from 20 to 35 in breadth, and 60 in height; a view shewing its peculiar elevation is likewise introduced; and the small aperture seen on the right of the highest point of the entrance leads to a chamber about six feet by four, in which there is an opening that looks into the interior. In the days of Dionysius, the existence of this chamber, and the path leading to it, were kept a most profound secret; and it is generally believed, that the tyrant used to resort to it for the purpose of listening to the conversation of the prisoners who were unfortunately confined within this horrid space.

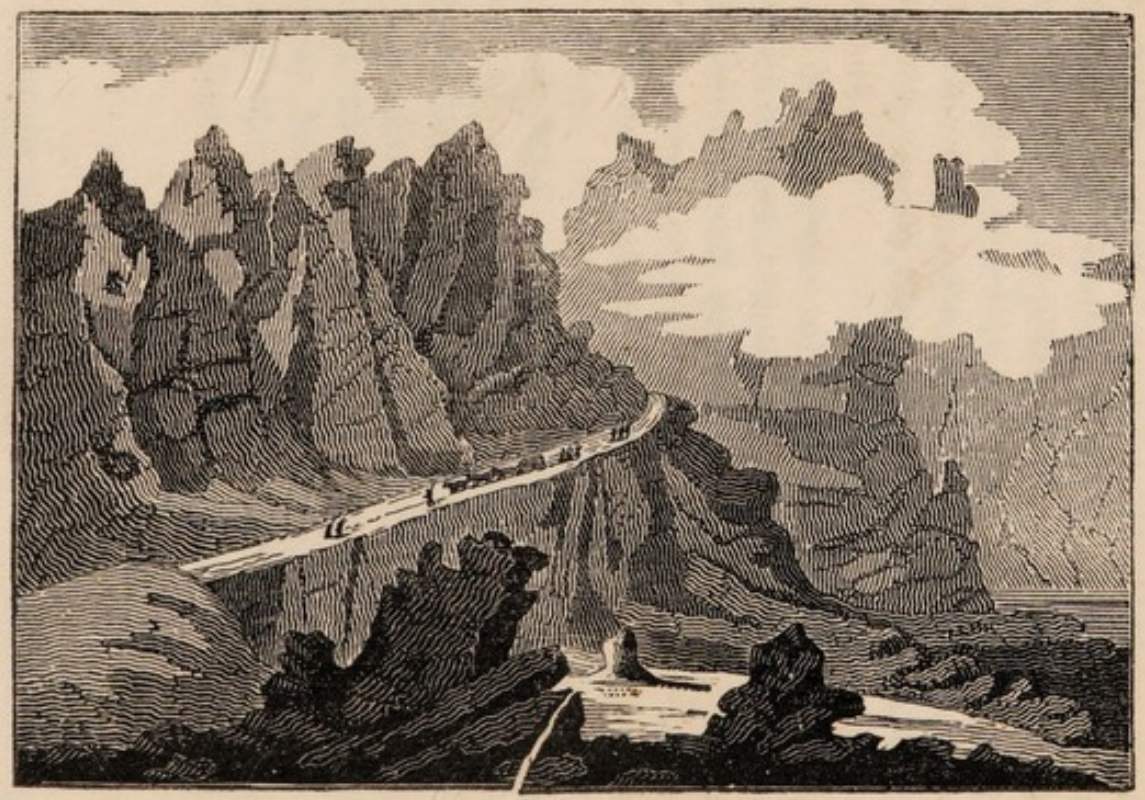
There being no trace of the original entrance to this chamber, we were under the necessity of ascending in the manner shewn in the accompanying view. When we had thus ascended, a conversation was carried on in an under voice, in order to ascertain the truth of the echo which this grotto was stated to possess; and what was said by our companions, stationed at its further extremity was most distinctly heard, as well as the action of tearing some

writing paper; so wonderfully surprising is the echo, or re-conveyance of sound in this singularly-constructed vault. Whether the primary formation was the work of chance, or whether it was excavated upon a preconcerted plan, it becomes neither the less interesting, nor the less extraordinary; it presents a gloomy, and, at the same time, most imposing effect, and almost realizes in the imagination, an idea of the cavern of the ancient Sibyls. This grotto, as we have already mentioned, is extremely sonorous, and reverberates the slightest sound many times; the echo is perfectly natural, although it is multiplied and prolonged to a considerable degree; and, independently of the extreme truth with which the voice is impelled back again, the power of it is likewise considerably increased.

For the purpose of enjoying this celebrated echo in the greatest perfection, we took a brace of pistols, with which we amused ourselves within this obscure retreat; and the report occasioned by their discharge produced a confused noise, resembling that of a long-continued peal of thunder. On another occasion, during the cool breeze of a delightful evening, we retired to this place, accompanied by a shepherd, who was accounted a tolerably good performer on the flute, for the purpose of hearing the effect produced by music; with this experiment we were highly gratified, inasmuch as the shepherd played some favourite Sicilian airs most delightfully, the melodious notes of which were echoed, and re-echoed, with enchanting fidelity.—Russel's *Tour through Sicily*.

REMARKABLE GROTTO IN SOUTH AFRICA.

In the Kango is the greatest natural curiosity of South Africa, a grotto of unknown extent. This I visited, and spent four or five hours in it. It was generally supposed that the end of it had been discovered, but we proved it to be still unknown; though from the information I received, we proceeded into it further than others, and our entrance into the third new-discovered chamber, or cave, was only prevented by a descent of fourteen feet. This great and



HOTTENTOT HOLLAND'S KLOFFE.

astonishing work of God is divided into various apartments, from 14 to 70 feet in length, and 8 to 100 in breadth. By measurement, I found that we had proceeded about 900 feet into a cavern of a mountain of 500 feet perpendicular; the grotto above the level of the river running by the hill is about 200 feet. The *stalactites*, united or disunited, form 100 figures, so that without any effect of imagination, nature would seem here to have assumed the province of art; for here canopies, organs, pulpits, vast candles, immense pillars, heads even of men and animals, meet the astonished visitor on all sides; so that he supposes himself in a new part of the universe. Eye, thought, and feeling, are equally overpowered; and, to complete this remarkable assemblage, there are various baths, or cisterns of water, as clear as crystal, divided by partitions, as if a most ingenious sculptor had wrought for some weeks in this subterraneous palace of nature. Ten young colonists, with two slave guides, and my servant, were with me. We had a flambeau and a number of large candles; but even these did not chase away the darkness which eclipsed the beauties of this great work of nature, which has been forming from age to age, and was first discovered in 1788; and what is remarkable, no traveller appears to have visited it.—THOM'S *Journey in South Africa.*

HOTTENTOT HOLLAND'S KLOFFE.

THIS famous pass, called Hottentot Holland's Kloffe, at the Cape of Good Hope, is perhaps one of the most surprising works of nature. It is situated about 30 English miles east of Cape Town, between two of the highest mountains of that immense ridge, which runs almost right across the peninsula, and stretches from the east to the west coast, shutting in the Hottentot country. This is the only communication from the ancient Dutch territory, adjoining the Cape Town into that country, either for waggons or cattle. An enemy, by taking possession of it, (and it might be defended by 100 men, against a whole army) would cut off all manner of supplies from the Cape

Town and Fort by land; and by thus severing the communication with the inland country, render abortive any assistance that might be drawn from thence, either with respect to supplies or a numerous militia. The possession of this pass would render the Cape Town and Fort, and neighbouring dependencies an easy prey to an invading enemy. This is so well known to the Dutch, that on the commencement of the late hostilities they immediately occupied this most important post; this post through which all provisions for the Cape Town and Fort must pass, there being no other mode of communicating with the inland country. The country between the Hottentot Pass and the Cape Town, is perhaps the most barren in its nature, excepting a small spot, well known for its valuable production of the wine called Constantia, the produce of which is confined through the avarice of the Dutch.

The possession of the Cape Town, Fort, and dependencies, would be of small value, as long as this pass should remain in the hands of the Dutch. It would be, in fact, the possessing of another island of St. Helena, and if we except its wine, neither more productive nor extensive.—*European Magazine.*

SINGULAR METHOD OF CROSSING THE ALPS.

The manner of crossing the Alps in some places is extremely curious; the inhabitants of Mount Cenis, who run up steep acclivities, loaded with the most heavy burdens, without suffering the least inconvenience, carry a person directly up a mountain, whose height is a good hour's journey, without panting or resting; and, on the plain above, proceed with amazing despatch. Then having re-fitted the chairs, which is done in a few minutes, they carry the company over the worst part of the way, for two hours together, making only four pauses, and those very short ones; such is the effect of custom, and of the simple diet, to which they owe their uncommon longevity, many of them attaining to above 100 years of age. Milk is their usual food, and they seldom taste any wine. To secure their footing, their shoes are without heels, and the soles rubbed with wax and rosin. The machines in which

they are carried, are a kind of straw chairs, with low backs, two arms, and. instead of feet, a little board hanging down by cords, for resting the traveller's legs. The seat which, is made of bark and ropes, twisted together, is fastened to two poles, and carried like a sedan, with broad leathern straps.

During winter, the plain on the top of Mount Cenis, being already covered with snow, is crossed in sledges, drawn by a horse or mule. In some places, the descent is performed in chairs; but from Mount Cenis to Laneburg, it is conducted in a most surprising manner. On the edge of the declivity is a house, where the traveller, getting into a sledge with his guide, slides down with such rapidity, that he is carried about three miles in seven or eight minutes, the swiftness of the motion almost taking away his breath. The guide sets forward, steering with a stick, and has on each side an iron chain, which he drops like an anchor, either to slacken or stop the course of the sledge.

In some of the mountains, the river Arva runs for many miles between high, craggy, and inaccessible rocks, which seem as if split on purpose, to give its rapid waters a free passage. The astonishing echos and continual sounds, occasioned by its streams, the trampling of the horses and mules, and the hallooing of passengers, in these places, are reverberated several times, with such amazing loudness, as fills a stranger with emotions of indescribable terror; and the firing of a gun or pistol, is here more dreadful than the loudest clap of thunder. The greatest cataracts of the river are, in several places, more or less loud and terrible, according as the waters are swelled by the melting snows, with which the tops of the mountains are covered. One in particular falls with great noise and violence from a prodigious high rock, above eleven hundred feet.—SMITH'S *Wonders.*

THE GLACIERS.

AMONGST the natural wonders of the Alps, the Glaciers, or valleys of ice, are most particularly deserving of attention; and these may be properly divided into the Upper

and Lower Glaciers, the first covering the declivities of the mountains, and the other occupying the intermediate valleys.

The Upper Glaciers may be subdivided into those which cover the summits, and those which extend along the sides of the Alps. Those on the very summit consist chiefly of snow, hardened by the extreme cold; but the sides are incrusted with a mixture of ice and snow, by reason of the superior power of the summer sun to dissolve the snow, which afterwards congeals into ice.

The Lower Glaciers, which are by far the most considerable, extend in some places to a length of several leagues. They do not, however, communicate with each other; few of them being parallel to the central chain, but, stretching mostly in a transverse direction, their higher extremities are bordered by inaccessible rocks, and their lower ones extend into the cultivated valleys. The thickness of the ice appears to vary considerably in different parts; for M. Saussure observes, that in the Glaciers de Bois, he did not find it exceed a hundred feet, though he was credibly informed, that in other places it was upwards of six hundred feet.

These prodigious masses of ice generally rest on one inclined plane, where being pushed forward by their own enormous weight, and but weakly supported by the rocks beneath, they are intersected by many large chasms, and exhibit a fantastic appearance of walls, pyramids, *&c.*

The surface of the ice is rough and granulated, so that persons may walk upon it in perfect safety, except in such parts as have a steep descent, or are covered with a collection of earth and stones, which have fallen from the mountains, and is generally known by the appellation of the Moraine. A celebrated traveller* who visited the Glacier des Bois informs us, that its appearance, at a distance, was really tremendous, and that the design of crossing it seemed utterly impracticable. Numerous broad chasms intersect it in every direction; but when the company entered upon it, they found that courage and activity were only required to accomplish their task. Having passed the Moraine, and entered upon the great body of

* Mr. Coxe.

the Glacier, they observed an abundance of little rills, which, being produced by the thawing of the ice, on the upper parts of the Glacier, precipitated themselves into the chasms with a violent noise, increasing the body of waters formed by the melting of the interior surface, and finding an outlet under the immense arch of ice in the valley of Chamouny. "Having proceeded about an hour," says Mr. Coxe, "we were astonished with a view more magnificent than imagination can conceive; hitherto the Glaciers had scarcely answered my expectations, but now they far surpassed them. Nature had clad herself in all her terrors. Before me lay a valley of ice, twenty miles in extent, bounded by a circular Glacier of pure unbroken snow, surrounded by large conical rocks, terminating in sharp points, like the towns of an ancient fortification; to the right rose a range of magnificent peaks, and far above the rest the magnificent summit of Mount Blanc, which appeared of such immense magnitude, that, at its presence, the circumjacent mountains, however gigantic, seemed to shrink before it, and hide their diminished heads. In half an hour we crossed the Moraine, which forms a branch of the valley, and proceeded upon a body of ice about three quarters of a mile broad. Then passing a second and third moraine, we descended upon the last ridge of ice, which was considerably broader than the two former, and full of large chasms."

They continued to ascend the Glacier, the scene constantly increasing in awful magnificence; and after walking about five miles, they quitted the ice, and gained the top of an eminence called the Couvercle, whence they had a most interesting prospect of the surrounding scenery.—Smith's *Wonders.*

REMARKABLE GROTTO

Among the curiosities of a country palace in Italy, called Pratolino, is a noble grotto, of which the roof alone is said to have cost 30,000 ducats, being all of coral, mother-of-pearl, and other costly materials; the walls are lined with the same, and the pilasters are adorned with

an organ, which by means of water plays several different tunes, whilst the god Pan joins his pipe to the music, and is answered by the warbling of a great variety of artificial birds. In the basin is a large dolphin carrying a woman on his back, and swimming about with several other figures, all moving as if alive. In another grotto, Galatea passes from a door in a sea-chariot, and returns again the same way, after having sailed some time upon the water. In one place, an angel blows a trumpet; in another, a clown carries a dish of water to a serpent, who lifts up his head and drinks; while smiths at work, mills in motion, and many other objects moved by water, contribute to adorn the grottoes of these delightful gardens.

SUBTERRANEAN CAVERNS IN GERMANY.

On the acclivity of a rocky mountain, near Adlesberg in Carniola, is a large cavern, divided into a great number of subterraneous passages; where a spectator is delighted with viewing a multitude of sparry icicles formed on the arched roof, by the exudations of a lapideous or petrifying fluid, which form the most beautiful decorations. The sides are also covered with numerous figures, produced by the same exudations, to which imagination has sometimes given the forms of dragons, horses, tigers, and other animals. Several sparry pillars are to be seen on each side, which unite with the icicles at the top by meeting them about half-way, and thus a complete colonnade is formed. It is said, that a person may walk about two German miles in the subterraneous passages of this cavern.

At the distance of about two miles from Adlesberg, is a still more remarkable cavern, named St. Magdalen's cave. The way to it is extremely difficult, from its being covered with stones and bushes: but the visitor is amply compensated for the fatigue of his journey by the splendour of the scene. The first descent is into a kind of hole before the entrance, which resembles a fissure in a huge rock, caused by an earthquake. Here torches are always lighted to conduct travellers, the cave being extremely dark. This wonderful cavern seems divided into several large halls and other

apartments. The vast number of natural pillars by which it is ornamented, give it a very superb appearance; for they are as white as snow, and possess a transparent lustre, which is perfectly enchanting. The bottom consists of the same materials; so that a contemplative spectator may easily suppose himself to be walking among the ruins of some magnificent palace, where prostrate columns, broken ornaments, and creeping damps, tell the sad tale of the ravages of time, and man's mortality. A profusion of sparry icicles, suspended from the roof, seems to resemble an elegant assemblage of wax tapers, of extraordinary whiteness; but the inequalities of the ground make the spectator liable to stumble, whilst his delighted eyes rove over the inimitable beauties which surround him.

HERMITAGE IN A CAVERN.

About three miles from Fribourg in Switzerland is an hermitage, dedicated to St. Mary Magdalen, and situated among woods and rocks, in the prettiest solitude imaginable. It has been described by several travellers, particularly M. Blainville and Mr. Addison, who both saw it about the beginning of the last century, when the hermit was still alive. He had wrought out of a rock a pretty chapel, with an altar, sacristy, and steeple; also five chambers, a parlour, refectory, kitchen, cellar, and other conveniences. The funnel of his chimney, which pierces from his kitchen to the top of the rock, slanting all the way, is 90 feet high, and cost him so much toil, that he was a whole year about it, and often despaired of completing his design. The chapel is 63 feet in length, 36 in breadth, and 22 in height; the sacristy, or vestry, is 22 feet square, and the height of the steeple 70 feet; the chamber between the chapel and the refectory is above 40 feet long, the refectory itself is 21, and the cellar is 25 feet long, and 10 feet deep. But the hall, or parlour, is particularly admired, being 28 paces in length, 12 in breadth, and 20 feet in height, with four openings for windows, much higher and wider than those of our best houses. At one end of this hall was the hermit's cabinet, with a small collection of books, and other curiosities; and to add to the pleasant-

ness of his habitation, he had cut the side of the rock into a flat, and having covered it with good mould, had formed a pretty garden, planted with several sorts of fruit trees, herbs, and flowers; and by following the veins of water, that dropped from several parts of the rock, he had made two or three fountains, which supplied his table, and watered his little garden. This hermit, whose name was Jean du Pré, began his laborious undertaking at the age of thirty, and said he was twenty-five years in completing it, having had no assistance from any person except one servant. He intended to have carried on his work still farther, but was drowned in 1708, as he was crossing a neighbouring river in a boat with some company that came to visit him. His place is supplied by a priest, who subsists by the generosity of strangers that come to see the hermitage, and he generally entertains his visitors with bread and wine, and a nosegay.—SMITH's *Wonders*.

THE GOLDEN CAVE.

AN account has been given, in the *Philosophical Transactions* of a remarkable cave some leagues to the north-west of Mexico, gilded all over with a sort of leaf-gold, which had deluded many Spaniards by its promising colour, for they could never reduce it into a body, either by quick-silver or fusion. Our author went thither one morning with an Indian for his guide, and found its situation was pretty high, and in a place very proper for the generation of metals. As he entered into it, the light of the candle soon discovered on all sides, but especially over his head, a glittering canopy of mineral leaves; but on his snatching at them, there fell down a great lump of sand, that not only put out his candle, but almost blinded him; and, on his calling aloud to his Indian, who stood at the entrance of the cave, it occasioned such thundering and redoubled echoes, that the poor fellow imagining he had been wrestling with some fearful spirit, soon quitted his station, and thereby left a free passage for some rays of light to enter, and serve him for a better guide. Our author's sight was somewhat affected by the corrosive acrimony of the mineral dust; but having

re-lighted his candle, he proceeded in the cave, heaped together a quantity of the mineral mixed with sand, and scraped off from the surface of the earth some of the glittering leaves, none of which exceeded the breadth of a man's nail, but with the least touch were divided into many lesser spangles, and with a little rubbing they left his hand gilded all over.

THE ELEPHANTA CAVE.

THE elephanta cave; situated in a small * island near Bombay, may be justly ranked among the most interesting antiquities of India; for it has not only excited the attention of every curious traveller, but ingenuity has been literally tortured, and conjecture almost exhausted, by the reiterated attempts of the learned to discover the era of its excavation, the purpose for which it was originally designed, and the true meaning of those hieroglyphic figures which are still to be seen sculptured on the walls.

This cave presents itself about half way up the ascent of the rocky hill, from whose bosom it is excavated; and the principal entrance is from, the north. The massy roof is supported by four rows of columns regularly disposed, but of an order in architecture different from any in modern use. Each pillar stands upon a square pedestal, and is finely fluted; but, instead of being cylindrical, gradually bulges out toward the centre. The capital is also fluted, and has the appearance of a cushion pressed flat by the enormous weight of the superincumbent mountain. Above these columns there runs a stone ridge, resembling a beam, cut out of the rock, and richly adorned with carved work; and along the sides of the cavern are ranged forty or fifty colossal statues, which, as well as the pillars, are shaped in the solid rock. Some of these figures wear rich diadems; others have on their heads a sort of pyramidical helmet; and others display only bushy

* The island of Elephanta is said to derive its name from the statue of an elephant cut out of the rock, conspicuously standing on the south shore, and so nearly resembling a real elephant, that at the distance of two hundred yards, a keen eye might be deceived by the similitude.

ringlets of curled or flowing hair. Many of them have four or six hands, in which they grasp the weapons of war and the trophies of peace; the symbols of justice and the ensigns of religion. Some of their countenances are extremely terrific, and some are marked with an air of deep dejection, while others are distinguished by a placid and serene benignity.

At the upper end of the cave, amidst a profusion of sculpture, appears an enormous bust with three heads, which is supposed to represent the great triple deity of India, Brahma, Veeshnu, and Seeva. The middle face, which is presented full, and expresses a dignified composure, is said to be upwards of five feet in length, and nearly four in width. The face on the right was probably designed to represent the amiable attribute of the preserver Veeshnu, as the face is literally illumined with smiles, and looks enamoured on a bunch of flowers which its left hand holds up to view; the right hand holds a fruit resembling a pomegranate, and on one of the wrists appears a ring, like that worn by the modern Hindoos. But the head on the left is certainly designed to express the dreadful attributes of the great destroyer Mahadeo; for the features appear distorted by contempt and fury. Serpents supply the place of hair; the tongue is violently thrust out between the teeth; the representation of a human skull is conspicuous on the covering of the head; and the right hand grasps a hooded snake, which appears to be about a foot in thickness. Each side of this niche is supported by a gigantic figure leaning on a dwarf.

To the right of the grand bust, stands a gigantic figure, which most travellers have denominated the Amazon, from the circumstance of its having no right breast, while the left is remarkably large and globular. This statue has four arms; the foremost right hand rests upon the head of a bull, the other grasps a hooded snake, and in the inner left hand is a circular shield, which the figure turns toward itself. The head is richly ornamented. On the right stands a male figure, bearing a pronged instrument, somewhat like a trident; on the left is a female, holding a sceptre; and near the principal is a beautiful youth sitting on an elephant. Above these are two curious figures, the one having four heads, and the other four arms; and

at the top of the niche appears a group of small statues, supported by clouds.

In a niche on the left of the great bust is a male figure, having four arms, and measuring nearly seventeen feet in height; and further to the left stands a female, about fifteen feet high, whose countenance is peculiarly soft and gentle. The circular rings, worn by the present Hindoo women, are observed on the wrists and legs of this figure; and the mode of putting up the hair bears a like correspondence. In the back ground appears one figure with four heads, supported by birds; and another with four arms, seated on the shoulders of a man: besides several smaller ones in attendance.

On each side of these curious groups is a small dark doom, which, in ancient times, was probably sacred to all but the unpolluted Brahmins; but is now occupied by bats, spiders, snakes, and scorpions. Captain Hamilton informs us, that, upon his entrance into the cave of Elephanta, he discharged a pistol on purpose to drive away those dangerous creatures; and that, at the sound, a huge serpent, fifteen feet long and two feet thick, issued from a dark recess, which compelled him and his companions to make a precipitate retreat.

To the left of the last described group is another, in which a male conspicuously appears, leading a female toward a majestic figure seated in the corner of the niche, and wearing a head-dress somewhat similar to that of an European judge on the bench. The countenance and attitude of the female is highly expressive of modesty and timid reluctance; but a male seems to follow and urge her forward.

In another niche, about fifty feet nearer the entrance, there is a very singular figure, which forcibly arrests the attention of every spectator. Its features are distorted, its mouth is wide open, and its whole aspect inexpressibly terrible. This statue, the limbs of which are carved in a gigantic style, has eight arms, but only six of them are now perfect. The two uppermost of those that remain are widely extended, and support a sort of canopy, upon which are sculptured various figures in attitudes of adoration. One of the right hands grasps a sabre, and the

other sustains, by the thigh, an* infant, whom the furious monster seems about to destroy. Of the two left hands the uppermost holds a bell, which is constantly used in the religious ceremonies of the Hindoos, and the lower one supports what M. Niebuhr thinks a basin to catch the blood of the infant; but which Mr. Hunter affirms, at the time of his visit, actually contained the mutilated figure of a child, with its face averted from the gigantic figure, and exceedingly bent; so that the head, which is now broken off, must have hung back very low, and have exhibited a horrid spectacle. Each arm of the great statue is decorated with bracelets, and on one of them is a chain of human skulls, which evidently shadow forth the destroying deity of India. Above and below this figure are several smaller statues, all of which have the sensations of distress and horror strongly depicted upon their countenances.

On the opposite side of the cave are the figures of a man and woman sitting, as the people of Hindostan do at present, with an attendant on each side.. At the feet of the male is the figure of a bull couchant; and in each corner of the niche stands a gigantic guard. Opposite is a correspondent niche; but the situation is dark, and the figures are greatly mutilated.

A niche, filled with defaced sculptures, is observed on each side of the entrance. On one side is a male, which appears to have had eight arms; but these are now broken off. In the back part is a figure with four arms, supported by birds; and another with four heads, whimsically elevated. In the opposite niche is a large sitting figure, together with a horse in the back ground, caparisoned according to the present mode of the country.

At the west end of this grand cavern is a dark recess, twenty feet square, totally destitute of any external ornament, except the altar in the centre, and eight gigantic figures which guard the four doors that lead into it. These figures, which are of the enormous height of thirteen feet and a half, are all finely sculptured in alto relievo,

* From this circumstance some travellers have supposed this sculpture to have been designed for a representation of the judgment of Solomon; but others, with greater appearance of reason, are of opinion, that it represents the tyrant Causa attempting the life of the infant god Creeshna, when fostered by the herdsman Ananda.

and appear as if starting from the wall to which they are attached. They have all rich collars round their necks, and their heads are decorated like those of the other statues. Of the striking attitude of one of these figures Mr. Hunter has recorded the following particulars: The whole weight of the statue seems to rest upon the right leg, while the knee of the left is somewhat bent; the right shoulder hangs downward, parallel to the body; the palm of the fore-hand sustains a globe; and the fingers are bent backward in a style that admirably represents the weight of the ponderous body they support. Such are the formidable guardians of a recess which was devoted to the most sacred mysteries of the Hindoo religion; but our pity and abhorrence are at once excited by the indelicate emblem, called the Lingam divinity, under which they represented, in this pagoda, the power of the first creative energy by whose operations all nature is produced.

Exclusive of the interesting objects that have already been described, there are compartments on both sides, separated from the great cavern by fragments of rock and loose earth, which may probably have fallen from the roof. That on the right is very spacious, and contains several pieces of sculpture; the most conspicuous of which has a human body, but the head of an elephant, and is supposed to represent Ganesæ, the first-born of a Seeva and the Hindoo god of wisdom.

The opposite compartment contains several figures, and a deep cavity in the rock is filled with excellent water, which, being always shaded from the sun, is deservedly esteemed by those persons whom curiosity leads hither through a scorching atmosphere. J. Goldingham, Esq., observes, that his account of the extent of this cavity, and the communication of its waters, by subterraneous passages, with others very distant, was given him by a native of the island; which would make a considerable figure in the hands of a poet.

The same learned gentleman observes, that the striking resemblance, in several particulars, of the figures in the cave to the present Hindoo race, would induce those who from history, as well as from observation, have reason to believe they have preserved the same customs from time immemorial, to imagine the ancestors of these people its fabri-

cators. But those who are, in a small degree, acquainted with their mythology will be persuaded of it; nor is a much greater extent of knowledge requisite to enable us to discover that it is a temple dedicated principally to Seeva, the Indian destroyer or changer. To deduce the era of the fabrication of this structure is not so easy a task; but it was, no doubt, posterior to the great schism in the Hindoo religion.—SMITH'S *Wonders.*

CATACOMBS AT ROME.

THE catacombs are a vast number of subterraneous galleries in the neighbourhood of Rome, that appear to have been ancient repositories of the dead; but whether originally dug by the heathens or the primitive Christians has been much disputed by the learned. Each alley or passage is about four feet broad, and six or eight feet high, and are not only carried on in a straight direction to a surprising length, but have others running off every way like so many streets of a city. On the sides of these alleys were the niches or graves where the dead bodies were deposited, lengthwise, three or four rows one over another, parallel to the alley. Each of these graves was just capable of receiving one body, and had its mouth closed with large tiles, and sometimes pieces of marble, cemented together in a curious manner. On some few of these tiles is found the name of the deceased person; but frequently a palm-tree engraven or painted. In some places, there are little grottos or chapels hewn out of the rock, going off from the common gallery, which have niches all round them, and are sometimes adorned with old mosaic work or painting. These seem to have been the burial places of particular families. As to the opinion of the primitive Christians digging these caves, and not only burying their martyrs there in times of persecution, but assembling in them for the performance of divine worship, it is highly improbable; for, as it is not to be conceived how they could carry on such a vast work unknown to their persecuting governors, considering the multitude of hands that must have been employed, and the mountains of rubbish brought out of these prodigious

caverns,—so likewise is it absurd to think they could hold assemblies amidst the annoyance of stench and corruption. It is, therefore, more reasonable to suppose, that the catacombs were originally the common sepulchres of the ancient Romans, and were not used after the custom of burning the dead was introduced amongst them, unless for slaves and the meaner sort of families.

ECHOES.

Echoes reside, for the most part, in ruined abbeys, in caverns, and in grottos: they reverberate among mountains, whisper in the areas of antique halls, in the windings of long passages, and in the melancholy aisles of arched cathedrals. There is an ancient portico near the temple of Clymenos, in the district of Cithonias, which repeats three times, on which account it is called the Echo. At Woodstock there was one which returned seventeen syllables during the day, and twenty in the night. In the sepulchre of Metella, the wife of Sylla; an echo repeated five different times, in five different keys; and Barthius, in his notes on Statius, relates, that on the banks of the Naha, between Bingen and Coblentz, an echo recited seventeen times. He who spoke or sung could scarcely be heard, and yet the responses were loud and distinct, clear and various; sometimes appearing to approach, at other times to come from a great distance, much after the manner of an Eolian harp.

In the cemetery of the Abercorn family, at Paisley, in the county of Renfrew, there is an echo exceedingly beautiful and romantic. When the door of the chapel is shut, the reverberations are equal to the sound of thunder. Breathe a single note in music, and the tone ascends gradually, with a multitude of echoes, till it dies in soft and most bewitching murmurs. If the effect of one instrument is delightful, that of several in concert is captivating, exciting the most tumultuous and rapturous sensations. In this chapel, lulled by ethereal echoes, sleeps Margery, the daughter of Bruce, the wife of Wallace, and the mother of Robert, king of Scotland.

A singular echo is heard in a grotto near Castle Com-

ber, in Ireland. No reverberation is observed till the listener is within 15 or 16 feet of the extremity of the grotto; at which place a most delightful echo enchants the ear. Does there exist any one who has not heard of the eagle's nest near Mucross Abbey, on the banks of the Lake of Killarney? This celebrated rock sends forth the most fascinating repercussion. Sound a French or bugle-horn, echoes, equal to an hundred instruments, answer to the call. Report a single cannon, the loudest thunders reverberate from the rock, and die in endless peals along the distant mountains.—*Philosophy of Nature.*

ECHO AT MILAN.

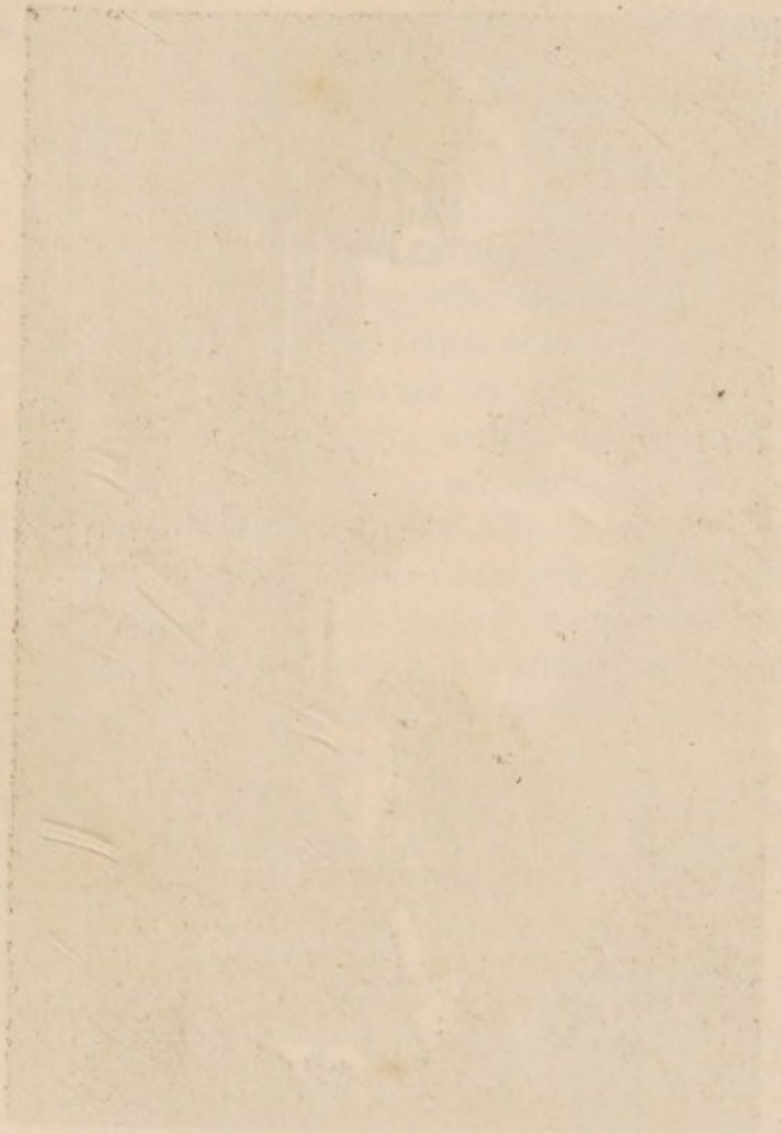
A NOBLEMAN'S seat, about two miles from Milan, produces such a surprising echo as can scarcely be equalled in the world. Mr. Addison observes, that upon firing a pistol he heard the sound returned fifty-six times, though the air was then foggy, and consequently not proper for making an experiment to advantage. At first the repetitions were very quick, but the intervals were greater in proportion as the sound decayed. This astonishing echo was probably never designed by the architect, but it is occasioned by two parallel walls of a considerable length, between which the sound is reverberated from one to the other till the undulation is quite spent. Some persons assert, that the sound of one musical instrument in this place resembles a great number of instruments playing in concert.—SMITH'S *Wonders.*

CATHEDRALS

ST. PETER'S AT ROME.

THE cathedral church of St. Peter's, at Rome, is esteemed a master-piece of modern architecture, and strikes the spectator with admiration and pleasing asto

ST. PETER'S AT ROME.



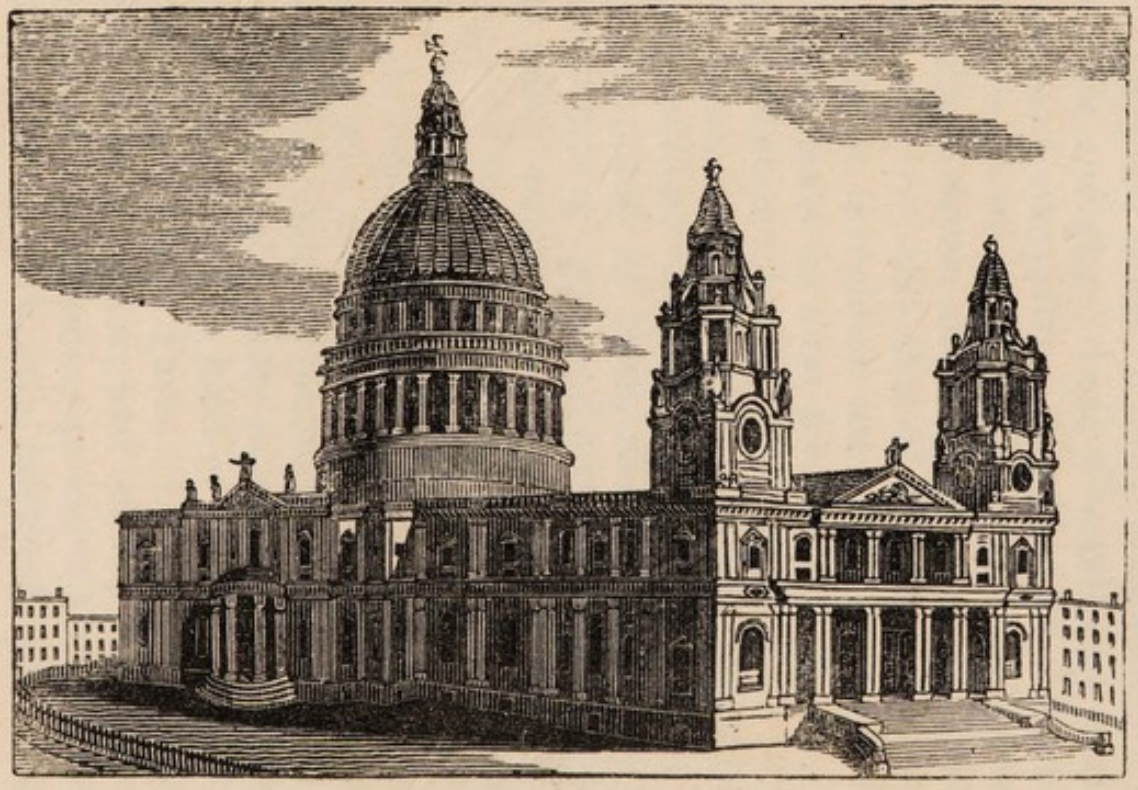
nishment. The circular area which lies before this magnificent edifice, is encompassed by a beautiful peristyle or colonnade, consisting of 284 marble pillars of the Doric order, which support an architrave, adorned with a vast number of statues of saints and martyrs. The obelisk already mentioned, and a fine fountain on each side of it, are great additions to the beauty of this spacious court, from whence there is a flight of steps to a grand terrace, that leads into the lofty portico before the church. Over this portico, which is supported by pillars 18 feet in circumference, are the statues of our Saviour and the twelve apostles; and there is also a fine balcony, where the popes are crowned in, in view of all the people. The body of the church, as well as the cupola, which is adorned with curious Mosaic work, is sustained by large square pillars, like those of St. Paul's cathedral in London; and under the middle of the cupola stands the high altar, which is 90 feet in height, being a kind of pavilion, supported by four wreathed columns of brass, adorned with foliage; and on the top of the canopy are four angels of gilt brass, holding festoons of flowers, most beautifully carved; and between them are figures of children playing on the cornice.

The ascent to the dome is by a winding staircase, and from thence to the ball, by an incommodious flight of stairs, which lies between the outer and inner dome. The height from the pavement to the top of the cross is 432 feet, and the diameter of the ball is 80 feet 4 inches. St. Peter's chair is made of gilded brass, and supported by four gigantic figures, representing four fathers of the church, with a glory over them, extending quite to the roof. Under this chair is an altar, and on each side are stately monuments of brass and marble, of excellent workmanship. It is scarcely possible to describe the riches and beauty of the little chapels and altars round this church; yet the gilding, carving, paintings, embossed work, brass and marble statues, *&c.*, are so well contrived and disposed, that the abundance occasions not the least confusion, nor does any thing appear superfluous. But among all the ornaments of this cathedral, none deserves our attention more than the Mosaic pictures which represent several pieces of scriptural and ecclesiastical history,

and exceeds anything of that kind that was ever done by the ancients.

Here it may be proper to inform the reader, that Mosaic work is an assemblage of little pieces of glass, marble, or precious stones, of various colours, cut square, and cemented on a ground of plaster, imitating the natural colours and degradations of painting. In this sense, it includes inlaid work, veneering, *&c.*; but in its more proper and restrained sense, it only comprehends works of stone, metals, and glass, those of wood being distinguished by the name of marquetry. The Mosaic of marble, which at present is most in use, serves for the pavements of churches and palaces, and the incrustations of the walls of the same edifices; but that of precious stones is so expensive, that it is seldom used unless in small works, such as ornaments for altar-pieces, rich tables, *&c.* The Mosaic work so much admired in St. Peter's is done with coloured glass, which kind, though now but little used, is extremely brilliant and durable. It is laid on a sort of plaster, composed of lime, fine brick-dust, gum-tragacanth, the white of eggs, and other ingredients; the pieces of glass being arranged with so much justness, and the light and shadow so well observed, that they appear as smooth as a table of marble, and as highly finished as a painting in fresco, with this advantage, that they have a fine lustre, and will last almost for ever, whereas time effaces all other kinds of painting. There is another sort of Mosaic work, of a more modern invention than any of the former, made with a kind of gypsum or talc, found in the stone quarries near Paris. Of this talc, calcined in a kiln, beaten in a mortar, and sifted, they form a sort of artificial marbles, imitating precious stones, and of these compose a Mosaic work, little inferior to the natural stones, either in point of lustre or durability.

Mr. Smollet, speaking of this church, in his travels through Italy, says, the Piazza is altogether sublime. The double colonnade on each side extending in a simicircular sweep, the stupendous Egyptian obelisk, the two fountains, the portico, and the admirable façade of the church, form such an assemblage of magnificent objects as cannot fail to impress the mind with awe and admiration: but the church would have produced a still greater effect, had



ST. PAUL'S, LONDON.

it been detached entirely from the buildings of the Vatican. It would then have been a master-piece of architecture, complete in all its parts, entire and perfect; whereas at present, it is no more than a beautiful member attached to a vast undigested and irregular pile of building. The great picture of Mosaic work, and that of St. Peter's bark, tossed by the tempest, which appear over the gate of the church, though rude in comparison with modern pieces, are nevertheless great curiosities, when considered as the work of Giotto.

The tribune of the great altar, consisting of four wreathed brass pillars, gilt, supporting a canopy, is doubtless very magnificent, but rather overcharged with sculpture, fluting, foliage, festoons, and figures of boys and angels, which, with the hundred and twenty-two lamps of silver continually burning below, serve to dazzle the eyes, and kindle the devotion of the ignorant vulgar, rather than to excite the admiration of a judicious observer.

There is nothing, however, in this famous structure so worthy of applause as the admirable symmetry and proportion of its parts. Notwithstanding all the carving, gilding, basso-relievos, medallions, urns, statues, columns, and pictures, with which it abounds, it does not, on the whole, appear over-crowded with ornaments. When you first enter, your eye is filled so equally and regularly, that nothing appears stupendous, and the church seems considerably smaller than it really is. The statues of children, that support the fonts of holy-water, when observed from the door, seem to be of the natural size; but as you draw near, you perceive they are gigantic. In the same manner, the figures of the doves, with olive-branches in their beaks, which are represented on the wall, appear to be within your reach; but as you approach them, they recede to a considerable height, as if they had flown upwards to avoid being taken.—Smith's *Wonders.*

St. PAUL'S, LONDON.

This magnificent cathedral, one of the finest protestant churches in the world, built in the purest style of Grecian architecture, stands upon an eminence to the north of the

river Thames. The first stone was laid by Sir Christopher Wren, on the 21st of June, 1675, in the reign of King Charles II.; the design was completed in 1710, but the decorations were not finished till the year 1723.

This cathedral is built of fine Portland stone, after the model of St. Peter's at Rome; having two ranges of pilasters on the outside, one above another, the lower range of the Corinthian order, and the upper of the Composite. The spaces between the arches of the windows, and the architecture of the pilasters, are filled up with various decorations.

The west front is beautified with a most magnficent portico, supported by twelve massy columns of the Corinthian order, and over those are eight composite columns, supporting a beautiful pediment, in which the history of St. Paul's conversion is cut in bas-relief. The ascent to this portico is by a flight of black marble steps; and over each corner of this front is an elegant turret. On the south side of the church is a portico with a dome, supported by six columns, and on the pediment is a phœnix in flames, with the word *resurgam* carved underneath it. The north portico corresponds with that on the south, and its pediment is embellished with the royal arms and other ornaments.

In the centre of the building rises a stupendous dome or cupola; and about twenty-five feet above the roof of the church is a circular range of columns, terminated by an entablature which supports a handsome gallery, adorned with a stone balustrade. On the summit of the dome is an elegant balcony, from which rises a beautiful lantern, adorned with Corinthian columns, and the whole is terminated by a gilt ball and cross.

On the inside, the cupola is supported by eight stupendous pillars curiously adorned; the roof of the choir is supported by six pillars, and the roof of the church by two ranges, consisting of twenty more.

Round the inside of the cupola runs a handsome iron gallery, where a whisper or even the ticking of a watch may be heard distinctly at the distance of a hundred feet.

The top of the dome is finely painted by Sir James Thornhill; the floor of the choir is paved with marble,

and the altar is adorned with four pilasters, painted and veined with gold, in imitation of *lapis lazuli.*

The length of this cathedral from east to west, including the portico is 500 feet: its breadth including the north and south porticos, 311; and its height, from the ground to the top of the cross is 344 feet.

This pile of building occupies an area of six acres, and is railed round with an iron balustrade, which is said to have weighed nearly three hundred tons, and to have cost upwards of 11,000*l.* The whole expense of building the cathedral amounted to 736,752*l.* 2*s.* 3*d.*

The clock-works are well deserving the attention of the curious. The fine-toned bell which strikes the hours, is clearly distinguishable from any other in the metropolis, and has been distinctly heard at the distance of 20 miles. The weight of the bell is 11,474 pounds. The clock-dial is 57 feet in circumference. The length of the minute-hand is eight feet. A model of the latter is kept in the gallery leading to the library, for the inspection of the curious.—SMITH'S *Wonders, and* RIVINGTON'S *Description.*

WESTMINSTER ABBEY.

ONE of the noblest specimens of Gothic architecture in England, is the Abbey of St. Peter at Westminster, so called from having been the church of a convent dedicated to St. Peter, which was destroyed by the Danes about the year 850. It was re-built by king Edgar, and enlarged by Edward the Confessor; but the present magnificent edifice was erected during the reign of Henry III. On the dissolution in 1539, this great monastery underwent the common fate of the religious houses; and the abbot, William Benson, having subscribed to the king's supremacy, was rewarded with the office of first dean to the new foundation, consisting of a dean and 12 prebendaries. In 1560 it was changed into a collegiate church, consisting of a dean and 12 secular canons, and other members; two schoolmasters, 40 scholars, 12 almoners, and several officers and servants.

The form of this church is that of a long cross, its

length is 489 feet; the breadth of the west end 66; that of the cross aisle 189, and the height of the middle roof about 92 feet. At the west end are two noble towers, built by Sir Christopher Wren; the nave and cross aisle are supported by 50 slender pillars of Sussex marble, about 12½ feet asunder, besides pilasters. There are 94 windows in the upper and lower ranges, all of which, with the arches, roofs, and doors, are in the ancient Gothic style. The interior of the church is admirably executed, and the prospectives very good, particularly that of the grand aisle. The new choir, which is the work of the late Mr. Keen, is executed in the ancient Gothic style, but the architect has so happily blended simplicity with ornament, as to produce the most pleasing effect. It has also this peculiar advantage, that it can, upon solemn occasions, be easily removed, and may be replaced without much trouble or expense. The altar is extremely beautiful.

The great west window, set up in the year 1735, is finely painted, with representations of Abraham, Isaac, and Jacob; the twelve patriarchs; Moses and Aaron; and the coats of arms belonging to King Sebert, Edward the Confessor, Queen Elizabeth, George II., and Dean Wilcocks, Bishop of Rochester.

In a smaller window on the right, is a figure supposed to be that of Edward the Black Prince, and on the opposite is another, which is conjectured to represent Richard II., but the colours being of a water blue, the features cannot be particularly distinguished. The three windows at the east end contain figures of St. John the Evangelist, Militus, Bishop of London, and two pilgrims; and the beautiful north window, which was put up in 1722, represents our Saviour with his twelve Apostles, and the four Evangelists.

In this venerable structure are 12 sepulchral chapels, containing several curious monuments of the sovereigns and nobility of Great Britain: a few of the most remarkable are inserted in this work for the entertainment of our readers.

The chapel of Henry VII. is situated to the east of the abbey, and is, in point of elegance, nearly the rival of that at King's College, Cambridge. The royal founder expended 14,000*l.* on this building, which he expressly

designed as the mausoleum of himself and his descendants. The ascent to the interior of this chapel is from the east end of the abbey, by steps of black marble leading to the gates, which are of brass, most curiously wrought in the manner of frame-work, having a rose and portcullis alternately on every other pannel. On the first entrance the eye is naturally directed to the roof, which is divided into sixteen circles of curious workmanship, and supported by 12 stately pillars, enriched with figures, fruitage, and other ornaments. The stalls are of brown wainscot, with Gothic canopies, and the arms and banners of the knights produce a fine effect. There are many statues in niches; and in the body of the chapel is the superb tomb of the royal founder and his queen, with their figures recumbent in brass. Here also are some elegant monuments erected to the memory of Margaret, Countess of Richmond, Queen Elizabeth, the unfortunate Mary Stuart, and several other illustrious personages.

Between the knights' stalls, under a broad marble pavement, is the royal vault, where repose the bodies of James I., William III., Anne, and George II. The length of this chapel is 99 feet, the breadth 66, and the height 54.

At the entrance of St. Edmund's Chapel is an alabaster statue of John of Eltham, second son of King Edward II.; his habit is that of an armed knight, and his head is encircled with a coronet of leaves. On a Grecian altar in the same chapel sits a statue of Lady Elizabeth Russel, who is commonly said to have lost her life by accidentally pricking her fingers; but this story seems to have no other foundation than a misrepresentation of the design: for the statuary having represented her as asleep, and pointing with her finger to a death's-head under her right foot, it has been supposed that the bleeding of her finger closed her eyes in death, whereas the design seems rather to allude to the serenity of her mind at the approach of death, which she considered only as a profound slumber, of which the motto *Dormit, non mortua est,* (She is not dead, but sleepeth,) is a clear confirmation. Here also are monuments to the memories of Lady Jane Seymour, William de Valence, and Mary, Countess of Stafford, wife to the unfortunate Viscount, who suffered decapitation in the reign of Charles II on Tower-Hill.

The chapel of St. Michael contains some of the finest monuments of Westminster Abbey. The tomb of Joseph Gascoign Nightingale and his lady, is the work of M. Roubiliac, and is justly admired by all judges of merit. Above, is represented a lady expiring in the arms of her husband; beneath, slily peeping from a tomb, the king of terrors presents his dreadful visage, and points his unerring dart at the sinking figure, while the distracted husband seems to clasp her to his bosom, and attempts to defend her from the fatal stroke. Opposite to this beautiful monument, is that of the Earl and Countess of Monutrath, which is equally entitled to our admiration from the grandeur of the design, and the extraordinary lightness of the execution. On the summit, is a representation of the celestial mansions, and their blessed inhabitants; and on a sarcophagus beneath, is the figure of the Countess, in the attitude of rising from the grave and supported by an angel, who, with his hand, points up to Heaven, where a seat is prepared for her reception, and where another angel waits to crown her with a wreath of glory.

The chapel of St. Andrew contains monuments to the memory of several honourable personages; but the most elegant are those of Sir Henry Norris, famous for his gallant conduct in the Low Countries during the reign of Queen Elizabeth; and Susannah Jane Davidson, who is represented just expiring, Death having pierced her breast with his fatal dart; an angel supports the female figure, and appears to offer consolation by pointing to the joys of futurity.

The tombs in the area and aisles of the church are far too numerous to admit of description in a work of this nature. Suffice it, therefore, to say that, among the most celebrated, the spectator may recognise those of General Wolfe, the Earl of Mansfield, William Shakspeare, Matthew Prior, John Milton, James Thomson, Nicholas Rowe, John Gay, Oliver Goldsmith, Geoffrey Chaucer, George Frederick Handel, Sir Isaac Newton, and many others, who have acquired immortal reputation by the brilliancy of their genius, or the happy result of their extraordinary exertions.—Smith's *Wonders.*

FOREIGN CATHEDRALS, CHURCHES &c.

THE HOLY HOUSE OF LORETTO.

The church of Loretto, in Italy, is a very magnificent fabric, built in the form of a cross, with a profusion of statues and paintings by the most celebrated masters. The cupola is very lofty, and supported by twelve stately pillars; and the doors of the church are of Corinthian brass, enriched with some elegant bas-relief.

Within the walls of this church stands the famous Santa Casa, or holy house, which has long occasioned a vast resort of pilgrims from all parts of Europe, and of which the following account is given by the Roman Catholics: This chapel, say they, was originally a small house in Nazareth, in which the blessed Virgin received the angel's salutation, and bred the Redeemer of the World. After her death, it was held in great veneration by the Christians, who at length consecrated it as a chapel, and prevailed on St. Luke to make the image which is now dignified with the name of Our Lady of Loretto. This sanctified edifice was permitted to remain in Galilee whilst that district was possessed by Christians; but, when Palestine fell under the dominion of infidels, a band of angels took it in their arms, and conveyed it to Dalmatia, whence it was afterwards carried across the Adriatic into the territory of Recanati, and finally placed on the eminence where it now stands.

This house, or apartment, is about thirty-two feet long, and fourteen broad; and the walls appear to be of brick, cemented with common lime and sand; but the interior consists of the choicest marble, and is ornamented with basso-relievos by the best sculptors which Italy could furnish in the time of Leo X. Prior to the late war, this chapel was the richest receptacle of the tribute of superstition in Europe; and its appearance was so extremely brilliant, that Mr. Addison observed, silver could scarcely find admission, and even gold looked but indifferently

among such an incredible number of precious stones. The statues of the Virgin and her Divine Infant were adorned with mantles of gold brocade, embroidered with precious stones, triple crowns of massy gold, enriched with diamonds of immense value, and collars of the same materials. Round the niche, where the statue was placed, a row of precious stones was curiously disposed, so as to form a kind of rainbow of different colours; twelve lamps of massy gold, each weighing thirty-seven pounds, were also suspended before the sacred images. The altar was of pure beaten silver; and the treasury, consisting of seventeen or eighteen large presses, was literally crowded with gold, coral, crystal, diamonds, and other offerings of princes, kings, and emperors. But when Loretto fell into the hands of the French, in the summer of 1796, these immense treasures were seized by General Buonaparte, and appropriated to the use of his army and the republic.

The spacious area before the great church, which encloses this building, is ornamented with a beautiful marble fountain, and a statue of Pope Sixtus V., in bronze; and the altars, or little chapels, are embellished with some good sculpture; but nothing is so interesting to a traveller of sensibility as the iron grates before these chapels, which were made of the chains and fetters of those Christian slaves who obtained their liberty by the glorious victory of Lepanto.

CATHEDRAL AT MILAN.

Next to St. Peter's, the cathedral of Milan is reckoned the most magnificent structure in Italy. It is a vast Gothic edifice, about 500 feet in length, and 200 in breadth, and is all of marble; 160 pillars of white marble support its stately roof, each of them valued at 10,000 crowns. The choir is wainscotted, and adorned with beautiful carved work, representing the histories of the gospel. The high altar is very sumptuous and majestic; and here are two noble brazen pulpits, each of them running round a large pillar like a balcony, and supported by huge figures of the same metal. As to the sta-

tues about this church, their number is prodigious, many of them as large as life, and of exquisite workmanship; but those who make them amount to 11,000, must include in the computation every particular figure in the historical pieces, and all those small ones that are frequently placed about the larger statues.

CATHEDRAL OF FLORENCE.

THE cathedral of Florence is one of the most superb and beautiful structures in Europe, the walls and pavement being of marble of various colours. It is 480 feet long, and 380 feet high to the top of the cross. The cupola is lofty, and of a vast circumference, being the first of the kind that ever was built in Europe, and that from which St. Peter's at Rome was copied. The painting in the inside of it represents the resurrection and the last judgment; and the body of the church is likewise adorned with the finest paintings, sculptures, and stately monuments. The bell-tower, or steeple, detached from the church, is much admired, being 180 feet high, all of fine marble of several colours, and adorned with a great variety of curious carvings and figures. The baptistery, which stands before the church, was anciently a temple of Mars, and is now remarkable for its three brazen gates, on which several pieces of scriptural history are so exquisitely represented in bas-relief, that Michael Angelo used to say, they were worthy of being the gates of Paradise. These gates were the work of Laurentio Cion, and took him up fifty years in finishing. Bishop Burnet observes, they are the best of the kind in the world; and adds, that the histories are represented with so much exactness, and the work is so beautiful, that a curious person might find entertainment for many days, if he would examine them with critical attention.

The chapel of St. Laurence (adjoining to the collegiate church of the same name) is the burial-place of the Medicean family, and is universally allowed to be one of the finest pieces of work in the world. This chapel is built in an octagonal form, having a spacious cupola for its roof, and its walls incrusted with jasper, agate, lapis-lazuli,

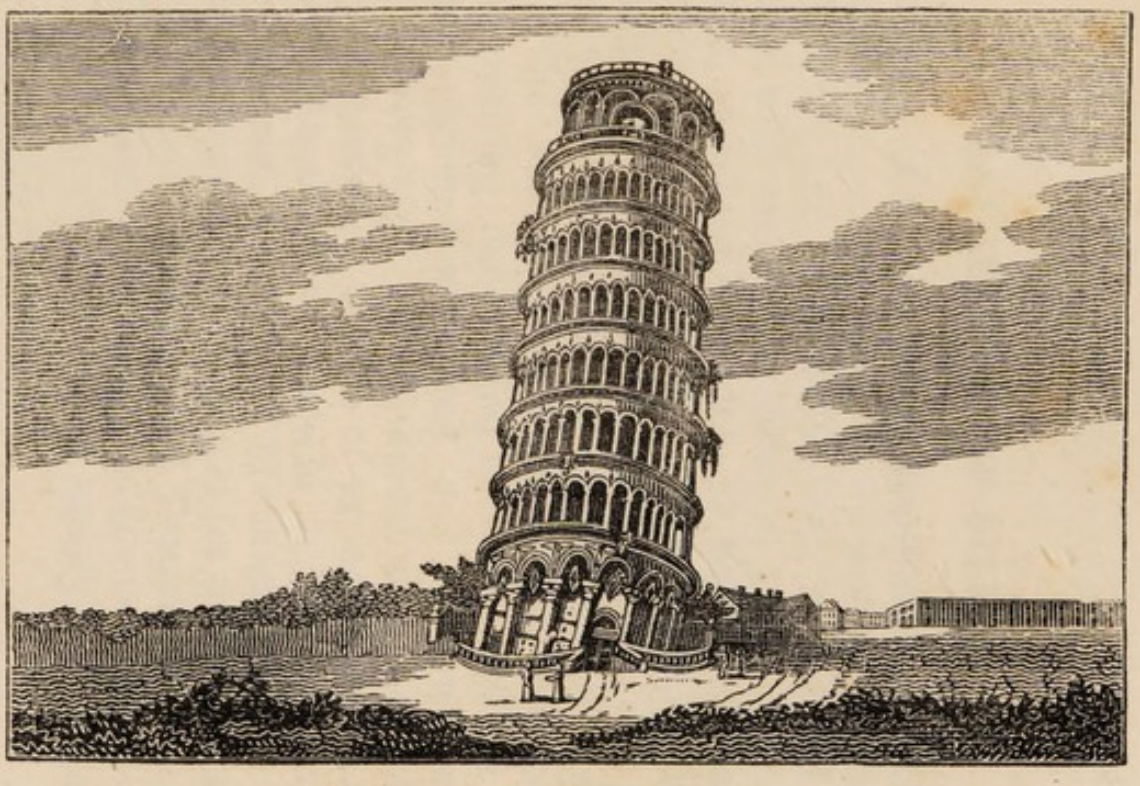
oriental alabaster, and other rich materials. All round it are the tombs of the great dukes of Tuscany, composed of porphyry, granite, and the most precious marbles; and on each tomb is a column of jasper, with a ducal crown on the summit, enriched with precious stones. Above these tombs the statues of the great dukes are placed in niches, all of gilded brass, and as large as life. In the middle of each face of the octagon, rises a double pilaster of jasper, and on the pedestal of each are several emblematical figures, curiously wrought with precious stones. The pavement is of the finest marble, and the roof adorned with lapis lazuli of the brightest blue, and spangled with stars of gold.—SMITH'S *Wonders.*

CATHEDRAL AT PISA.

THE cathedral of Pisa, in Italy, is one of the most regular, beautiful, and lightsome pieces of Gothic building to be seen in Europe. The choir is of the finest marble; and the roof is supported by eighty columns of the same stone, all of one solid piece, being part of the spoils taken by the Pisans, in their eastern expeditions, when the republic was in a flourishing condition. The pavement is of tesselated marble; and the paintings, especially those of the choir, are done by the greatest masters. The three gates of this church are of brass, and are exquisitely wrought with the history of our Saviour's birth, life, and passion. The baptistery is a fine marble structure, shaped like the cupola of St. Peter's at Rome, and supported by beautiful pillars.

LEANING TOWER AT PISA.

THE celebrated campanile or leaning tower, although detached, may be said to belong to the cathedral. It is of a round form, and one hundred and eighty feet high, entirely built of white marble. It was finished in 1174, and is ascended by two hundred and thirty steps, has several galleries on the outside, and is open in the interior. It is fourteen feet out of the perpendicular. Its effect appears most striking when viewed from the angular corner of the Duomo or Cathedral. This tower was intended as a belfry to the Duomo. There is a fine view towards Leghorn, Lucca, and Florence, from



LEANING TOWER AT PISA.

this famous leaning tower, so much talked of by travellers. The doors are of bronze, and said to be brought from Jerusalem. This building is a curiosity in architecture, extremely well deserving the notice of all travellers. Some conceive its reclining position to be occasioned by a sinking of the earth, and others to the ancient builders aiming at eccentricity in erecting this remarkable tower.

THE CATHEDRAL OF SIENNA.

The cathedral of Sienna is a master-piece in the Gothic kind of architecture, and may be viewed with pleasure after St. Peter's itself. The walls, both within and without, are faced with marble of different colours: and the roof is azure, sprinkled with stars of gold. The portico is extremely magnificent, and the whole fabric is adorned with a variety of excellent statues, busts, &c., and particularly with the heads of a long succession of popes in alabaster. The windows are formed by a multitude of little pillars retiring one behind another; and the large columns are enriched with fruit and foliage from the bottom to the very top. The pavement also is exquisitely fine, being composed of marble of various colours, forming a sort of Mosaic work, wherein is represented, in a most lively manner, the story of Abraham going to sacrifice his son, the passage of the Israelites through the Red Sea, and other histories of the Old Testament. In order to preserve this beautiful work, it is covered with boards, which are occasionally taken up to satisfy the curiosity of strangers.—Smith's *Wonders.*

CATHEDRAL AT SEVILLE.

Some persons are of opinion, that the Cathedral at Seville, in which there is a mixture of the Gothic and Moorish style, has something in it that looks majestic beyond any other in the kingdom. It is certainly a very stately edifice, being 407 feet in length, 270 in breadth, 128 in height; and its roof is supported by two double rows of

beautiful columns. The tower of this church is 350 feet high, built of brick, with large windows to give light to the stair-case, the ascent of which is so easy, that a person may ride up it on horseback, or even in a chaise. It is terminated by a cupola, on the top of which is the figure of a woman in brass, that turns to point out the wind like a weather-vane. The inside of the church is adorned with statues, paintings, monuments, and other decorations; and the magnificent tabernacle on the high altar is of massy silver, weighing above 600 pounds.

CATHEDRAL AT LYONS.

The Cathedral at Lyons, dedicated to St. John, is a magnificent and venerable fabric; and the front of the high altar, which stands in the middle of the choir, was formerly adorned with abundance of fine images, most of which have been defaced or destroyed, during the late commotions. In one of the transepts, is the famous clock made by Lipsius of Basle, in 1598, a full description of which we have given among the curious articles of mechanism, (page 26.) It is a most ingenious piece of workmanship, and is deserving the attention of all travellers.

MAGNIFICENT CHURCH AT BERN.

The great church at Bern, in the canton of the same name, is a very magnificent structure, and is reckoned a master-piece of Gothic architecture. It has a fine lofty steeple, and is remarkable for having the largest bell in Switzerland, weighing upwards of ten tons. The great door is adorned with a representation of the parable of the wise and foolish virgins; and the paintings and sculptures which decorate the interior of the church are well executed.

WILLIAM TELL'S CHAPEL.

On the fine lake of Urio, upon a rock projecting into the lake under a hanging wood, near the village of Gruti, is a

chapel, erected in honour of William Tell, on the spot where he is said to have leaped from the boat which was conveying him as a prisoner. The Emperor Albert having the ambitious design of conquering Switzerland, in order to make a patrimony of it for one of his younger sons, had by degrees succeeded in subduing the greater part; and, under false pretences, had sent arbitrary baillies and governors, who exercised much cruelty and oppression upon the people. The worst of these was Geissler, a rapacious and ferocious man, whose castle in Uri was a continued scene of barbarity and plunder. Discontents had already taken place, and the people not only murmured, but had meetings on every fresh insult; when in the year 1307, Geissler, to prove his power and indulge his vanity, erected his hat on a pole in the market-place of Altorf, and insisted on the people bowing to it as they passed. William Tell refused. The tyrant, to revenge himself, ordered Tell's youngest son to be brought to the market-place, and, tying him to a stake, placed an apple upon his head, and desired the father to shoot at it with his cross-bow. William Tell succeeded in hitting the apple; but when the tyrant asked him the reason of his having another arrow concealed in his dress, he replied, *To have killed you, had I killed my son.* The offended governor had Tell seized and bound, and placed in the same boat with himself, resolving to carry him across the lake to his own castle. A frightful storm (to which the Swiss lakes are liable) suddenly arose, and they were obliged to unchain the prisoner, who was celebrated for his skill as a mariner. He conducted them near a ridge of rocks, and vaulting from the boat, with his cross-bow in his hand, killed the tyrant! To this Tell and Switzerland owed their deliverance. The chapel is built on the very spot, surrounded with picturesque wood; and the simple story of Tell, in the appropriate dresses, is painted within the chapel.

And hail the chapel! hail the platform wild!
Where Tell directed the avenging dart,
With well strung arm, that first preserv'd his child,
Then wing'd the arrow to the tyrant's heart.

REMARKABLE

MONUMENTS AND INSCRIPTIONS,

IN DIFFERENT PARTS OF THE WORLD.

In the Church of *St. Genevieve*, at Paris, is an inscription to the memory of

MARIA MARTINOZZI,
Princesse De Conti,

Who retiring from the world in the nineteenth year of her age, sold all her jewels for the support of the poor of the provinces of Berri, Champagne, and Picardy, during the famine in the year 1662; practised all the austerities her constitution would bear, remained a widow from the twenty-ninth year of her age, in order to bestow a Christian and virtuous education on the princes, her sons, and to maintain justice and religion through all her estates; confined herself to a very moderate expense; restored all the effects, the acquisition of which seemed doubtful to her, to the value of 800,000 livres; distributed all the overplus of her fortune to the needy in her own lands, and all other parts of the world; and suddenly passed from life to eternity, after sixteen years' perseverance, in February 1672, in the thirty-sixth year of her age.

Pray for her.

Louis Armand De Bourbon, Prince De Conti, and Francis Louis De Bourbon, Prince of Roche Sur Gonne, her children, have erected this monument.

Battersea, Surry.

In this church is a very singular monument erected to the memory of SIR EDWARD WINTER, an East-India Captain, who died at York-house, in the reign of King Charles II. It is against the south wall; on the top is his

bust, of a large size, with whiskers; and underneath the inscription, is a basso-relievo, representing him in the act of performing the two exploits mentioned in his epitaph. It is reported of him, that being attacked in the woods by a tiger, he placed himself by the side of a pond, and when the tiger flew at him, he caught him in his arms, fell back with him into the water, got upon him, and kept him down, till he drowned him. This adventure, as well as another wonderful exploit, is vouched for in the following lines, inscribed upon the monument:

Born to be great, in fortune as in mind;
Too great to be within an isle confin'd,
Young, helpless, friendless, seas unknown he try'd,
But English courage all those wants supply'd.
A pregnant wit, a painful diligence,
Care to provide, and bounty to dispense,
Join'd with a soul sincere, plain, open, just,
Procur'd him friends, and friends procur'd him trust.
These were his fortune, rise, and thus began
The hardy youth, rais'd to that happy man.
A rare example, and unknown to most,
Where wealth is gain'd, and conscience is not lost,
Not less in martial honour was his name,
Witness his actions of immortal fame.
Alone, unarm'd, a tiger he oppress'd,
And crush'd to death the monster of a beast.
Thrice twenty mounted Moors he overthrew,
Singly, on foot, some wounded, some he slew,
Dispers'd the rest: what more could Sampson do?
True to his friends, a terror to his foes
Now here in peace, his honour'd bones repose.

The following very remarkable epitaph is taken from a brass plate affixed to a stone in the *Cathedral of Ely*, between the monuments of Bishop Heton and Bishop Gunning:

Yet a very little, and he that will come shall come.
The speritt and the bride say come.
Lett him that heareth say come.
And lett him that is a-thirst say come.
Even so come Lord Jesv.

Vrsula { Tyndall by birth.
Coxee by choice.
Vpcher in age and for comfort.

Anno Ætatis 770.

N. B. This gentlewoman was the daughter of Dr Humphrey Tyndall, first Dean of Ely, and was called Sappho, from her wit and morals. She married at twenty, became a widow at forty-two, and after having enjoyed her liberty thirty-five years, married again at seventy-seven, a lad of nineteen, "for comfort," being within two months of her end.

In *Westminster Abbey* is an elegant monument, with appropriate figures, to the memory of the immortal Newton, with the following inscription in Latin:

Sir Isaac Newton,

Born December 25th, 1642, died 20th March, 1726.

Here is deposited Sir Isaac Newton, knight, who, by the light of mathematical learning, and a force of mind almost divine, first explained the motions and figures of the planets and planetary orbits; the paths of the comets, the tides, and the ocean; and discovered, what no one before had ever suspected, the difference of the rays of light, and the distinction of colours thence arising. He was a diligent, faithful, and penetrating interpreter of nature, of antiquity and the Holy Scripture. By his philosophy he asserted the majesty of God, the greatest and most glorious of all beings; and by his morals expressed the simplicity of the Gospel. Let mortals congratulate themselves, that there has been so great, so good a man, the glory of the human race.

The following couplet was intended for his monument, by Mr. Pope.

Nature and Nature's laws lay hid in night:
God said, *Let Newton be,* and all was light.

Westminster Abbey.

DR. BUSBY.

Behold! underneath lies the image of Busby: such as he appeared to human eyes. If you desire to see that part of him more deeply impressed on their minds, thoughtfully survey the shining characters of both universities, and the law, and the leading and principal men in the court, the parliament, and the church. When you have seen such a full-sown and plenteous harvest of ingenious men, only consider what he must have been who sowed it. This was he who nicely discovered, usefully managed, and happily improved, the natural genius of every one; this was he, who, by his instructions, reformed and nourished the minds of youth, that they learned to grow wise as they learned language; and while they were educated as boys they improved as men. As many as, taught by him, appeared in public, so many faithful and strenuous assertors were raised to the church and monarchy of England. Lastly, whatsoever fame the school of Westminster boasts, and whatever advantage mankind shall reap from thence, is principally owing to Busby, and will be owing to him in all ages. So useful a member of the commonwealth, God was pleased to bless with length of days and increase of riches; and, in return, he cheerfully devoted himself and his for the promotion of piety, to relieve the poor, to encourage learning, and to repair churches. These were his ways of enjoying wealth, and what he did not employ in his life-time to this purpose, he bequeathed at his death.

On the Pedestal.

RICHARD BUSBY, of the county of Lincoln, D.D., born at Lutton, 1606, September 22. Made master of Westminster College, 1640, Dec. 23. Elected prebend of Westminster, 1660, July 5; and treasurer of Wells, Aug. 11, in the same year. He died 1695, April 5.

IN *St. Agnello, Naples*, is a Latin inscription which in English runs thus:

Dear Father, receive this monument as a small acknowledgement for all the valuable favours received from

you. Had it been possible for me to have transformed myself into marble, you would have had no other tomb than my body, nor any other epitaph than this :—" The grateful *Alexis* returns his father the being he received from him, and becomes his parent's sepulchre."

St. Flavian's, by Monte Fiascone.

Est. Est. Est. Ppr. Nium. Est. Hic.
Io. De. Flec. D. Meus. Mortus est.

THIS is on a tomb of a German prelate, who was no enemy to the bottle; for in travelling, it appears, he always sent his steward forward to taste the wines of the several inns upon the road; if tolerably *good*, the *major-domo* was to chalk upon the door in capitals, the Latin word *est* (it is); if very good he was to write *est, est*, and the bishop had ever full reason to be content with his steward's superlative taste. Being arrived at *Monte Fiascone* the steward found the muscadel wine so delicious, that he did not scruple to triple the *est*, and the bishop so coincided in his taster's opinion, that, from an inordinate devotion to it, he died in a few days. He bequeathed 10,000 crowns to the hospital there, on condition that on Whitsunday they should annually give, to all persons who might come for it, as much muscadel wine and bread as they could eat and drink at a meal. There is a handsome monument, with a figure of the bishop, in his pontifical vestments, mitre, crosier, &c., and on each side of his effigies there are two escutcheons,—and as many *drinking-glasses!*

New Church, Amsterdam.

"EFFEN UYT!"

THESE Flemish words are on a very ancient funeral monument of whitish marble, on which is also engraven a pair of slippers of a very singular kind. *Effen Uyt* means Exactly. The story is, that a man, tolerably rich, and who dearly loved good eating, took it into his head that he was only to live a certain number of years, and no

longer. In this whimsey he counted that, if he spent so much a year, his estate and his life would expire together. It happened that he was not deceived in either of these computations, for he died precisely at the time he had prescribed to himself, and had then so far exhausted his fortune, that, after paying his debts, he had nothing left but a pair of slippers. His relations buried him creditably, and caused the slippers to be carved on his tomb, with the above-mentioned laconic words.

Bideford Church, Devon.

If to have been an eminently good and useful man in his place and time, be a just claim to perpetual remembrance, the subject of the following epitaph was peculiarly entitled to this frail kind of immortality.

He was born at Bideford, of a very respectable and ancient family. In his youth he experienced some very remarkable deliverances from imminent dangers, which seemed to indicate him born for the good of his fellow-creatures. He fell, at one time, from a craggy precipice of a tremendous height, without hurt; and, another time, an arrow struck him forcibly on the forehead, without any other consequence than leaving a mark, which remained to his death.

Though he carried on a very extensive foreign trade, and had many ships on the sea at once, it was remarked that he never lost one.

The plague breaking out in the town, in the year 1646, the mayor ran away, and Mr. Strange, with amazing boldness and philanthropy, took the critical office on himself. to the great comfort of the inhabitants in their grievous distress. He visited every infected house, took care to supply the needy with food and physic, and saw the dead buried with decency. When thus, by his prudent management, the town was cleared of this dreadful enemy, Mr. Strange fell the last victim to its rage.

The following epitaph is engraven on a fair monument, beneath the bust of this excellent man, who appears to have been the Howard of his day.

Sacred to the memory of

MR. JOHN STRANGE,

Sometime merchant of this town, whose sweetness of disposition, affability in discourse, courteousness in carriage, uprightness in commerce, fidelity in magistracy, largeness of heart, and liberality of hand to the needy, bountifulness in hospitality, humility in the flow, equability in the ebb, of outward things, and sincere love to God, his Gospel, and Saints; having lived beloved, and deservedly honoured after the pilgrimage of fifty-six years ended, died, and, not without great cause, much lamented August, Anno Dom. 1646, in his fourth and fatal mayoralty; whose better part returning whence it came, he left unto the world the precious odour of a good name, and the choice example of a sweet conversation, together with his earthly tabernacle, put off, and hereby interred, till being refined, and raised a glorious body, the more glorious soul returns to take possession of it, and both be rapt up to enjoy that bliss that knows neither tearme nor tedium.

St. Helen's, Bishopgate.

BANCROFT'S

Monument in this church is of a square form, and has the following inscription:

"THE ground whereon this tomb stands was purchased of this parish in the year 1723, by Francis Bancroft, Esq., for the interment of himself and friends only, (and was confirmed to him by a faculty from the dean and chapter of St. Paul's, London, the same year,) and in his lifetime he erected this tomb, Anno 1726, and settled part of his estate in London and Middlesex for beautifying and keeping the same in repair for ever."

This monument, which was erected a little before Bancroft's death, has an entrance at the west end, with folding wainscot doors, and a large pane of glass in each, through which to see his coffin and bowel-box. Bancroft, likewise, by will, ordered the "lid of his coffin to be fixed thereon only with strong hinges, for the ready opening the same." It is supposed that he intended his corpse should be as

often viewed by the committee of the Drapers' Company as they visit his tomb, which they have done several times. The vulgar also report that a spring lock was made to fasten the coffin-lid, the key of which was hung on a nail within the coffin, for the purpose of Bancroft's letting himself out after the expiration of a certain time, which he prophesied for his resurrection from the grave.

As the reader may be desirous of knowing something more of this extraordinary person, it is necessary to inform him that Francis Bancroft was for many years one of the Lord Mayor's officers for the city of London, who, in the execution of his office, by information, and summoning the citizens upon the most trifling occasions, and for many things not belonging to his office, not only pillaged the poor, but likewise many of the rich, who, rather than lose time in appearing before the magistrate, gave money to get rid of this common pest of the citizens; by which, together with his numerous quarterages from brokers, &c., he annually amassed a considerable sum.

But by these and other mercenary practices, he so effectually incurred the hatred and ill-will of the citizens of all denominations, that the persons attending his funeral obsequies, with great difficulty saved his corpse from being justled off the bearers' shoulders in the church by the enraged populace, who, seizing the bells, rang them for joy at his unlamented death,—a deportment heretofore unheard of even among the London rabble.

St. Paul's Covent-Garden.

In Memory of

SAMUEL HOUSE,

Who departed this life the 23d of April, 1785,
Aged 60 years.

He was a lover of liberty, and a real friend to the
Natural rights of the people.

THIS man kept a public-house in Wardour-street, Soho, and was justly considered one of the most extraordinary

characters of modern times; he never wore a coat nor a wig, nor was ever found in bed (except when ill) after four o'clock in the morning: though blunt and uneducated in his manners, he was just and honest in all his dealings, and his word upon all occasions was sacred; he frequently called upon the great, and was admitted into their presence, but he never changed either his dress or his character.

His usual dress was what may be called a black doublet or waistcoat, open at the neck, black silk breeches, open at the keees, white silk stockings, and slippers.

In the church at *North Church, Herts*, is a brass plate fixed up, with a sketch of the head of Peter the Wild Boy, and underneath the following inscription:

To the memory of Peter, known by the name of the Wild Boy, having been found wild in the forest of Hertswold, near Hanover, in the year 1725. He then appeared to be about twelve years of age. In the following year he was brought to England, by order of the late Queen Caroline, and the ablest masters were provided for him. But proving incapable of speaking, or of receiving any instruction, a comfortable provision was made for him at a farm-house in this parish, where he continued to the end of his inoffensive life. He died on the 22nd of February, 1785, supposed to be aged 72.

It is reported, that his countenance much resembled that of Socrates. He could never be taught to articulate any words, though he hummed a tune or two very ill. He was very fond of ale and tobacco, and had retained so much of his court breeding as to kiss the hand of the person who gave him money. He was extremely sensible of the change of the weather, and used to howl and be very wretched before rain. He was supposed to have been an idiot, purposely put in the way of George I., in the forest where he was discovered.

St. Germain's Cathedral, Isle of Man.

SAMUEL RUTTER,

Bishop of Sodor and Man, was buried under the uncovered steeple of his own cathedral, with a Latin inscription, on a brass plate, which in English is thus:

In this house, which I have borrowed of my brethren the worms, do I lye, Samuel, by Divine permission, Bishop of this island, in hopes of the resurrection to life: reader, stop, view the Lord Bishop's palace and smile: he died May 30th, 1662.

IN the choir of the parish church of *Hindlebanch*, in *Switzerland*, is an elegant monument, to the memory of MADAME LANGANS, executed by John Augustus Nahl, late sculptor to the King of Prussia.

This lady, who was esteemed the greatest beauty in Switzerland, died in child-bed, at Hindlebanch, in the delivery of her first infant, at the age of 28. Her husband, who was parson of the village, deeply afflicted at the loss, found, in Mr. Nahl, an artist, who by his efforts eternized the grief of the husband and the memory of the beloved wife.

The innumerable instances of these monuments of human fragility appear to have exhausted all resources of art and genius; but Mr. Nahl was not deterred by this vulgar sentiment. Mad. Langhans having died on Easter eve, the circumstance of the event happening at that critical moment, inspired him with so happy an allusion to the certainty of our resurrection, so new, so simple, and at the same time so sublime, that no person can withhold their admiration.

From a simple block of freestone, but of a very fine grain, he formed the figures and the tomb. The tomb bursts asunder, as if the day of general retribution was arrived, when the sepulchres must deliver up their dead. The stone which covers the tomb rises up as it breaks in the centre, and discovers this beautiful woman and her infant, just recovered from the dead. She rises on the instant of her awaking, and seems on the point of taking

her flight to the heavens. The sentiment of her happy immortality gives a serene and majestic composure to her countenance; with one arm she appears to push up the stone, which yet opposes her passage, and with the other presses to her bosom her re-animated infant, who also, with his little hands, seems inclined to assist in disengaging themselves from the dismal abode.

The cleft, where the stone separates into three pieces, is so naturally expressed, that the spectator is disposed to wait in expectation of seeing the tomb open altogether. It is placed even with the ground, if not a little sunk, and is closed in with two wooden doors, which are thrown open to such persons as are drawn to the place for the purpose of beholding it.

Walton-upon-Thames.

In the chancel of the church of *Walton-upon-Thames*, in the county of Surry, are several brass plates, nailed against the south wall, to the memory of one John Selwin, celebrated for his remarkable strength, as appears by the following traditionary story:

John Selwin, the person represented on these plates, both in a praying posture, and in the act of killing a stag, was, as appears by the inscription, under keeper of the park at Oatlands, in Surry, in the reign of Queen Elizabeth: the bugle-horn, the insignia of his office, being apparent in both figures. This man was extremely famous for his strength, agility, and skill in horsemanship, specimens of all which he exhibited before the queen, at a grand stag-hunt, in that park, where attending, as was the duty of his office, he in the heat of the chase suddenly leaped from his horse upon the back of the stag (both running at that time with their utmost speed), and not only kept his seat gracefully, in spite of every effort of the affrighted beast, but drawing his sword, with it guided him towards the queen, and, coming near her presence, plunged it into his throat, so that the animal fell dead at her feet. This was thought sufficiently wonderful to be chronicled on this monument, and he is accordingly there portrayed in the act of stabbing the beast.

RUINS.

ANCIENT BABYLON.

THE city of Babylon, the capital of the ancient kingdom of Babylonia, is supposed to have been situated in N. Lat. 32° 34′, and in E. Long. 44° 12′ 30″. It was founded by the first descendants of Noah, 2,234 years before Christ; enlarged by Nimrod, the great grandson of Noah, 2,000 years B. C.; and in a manner completely re-built, about 1,200 years before Christ, by the Assyrian queen, Semiramis. It was greatly strengthened and beautified by various succeeding sovereigns; but it was by Nebuchadnezzar, and his daughter Nitroscis, that it was brought to such a degree of magnificence and splendour, as rendered it one of the wonders of the world.

Babylon stood in the midst of a large plain, in a very deep and fruitful soil. It was divided into two parts by the river Euphrates, which flowed through the city from north to south. The old city was on the east, and the new city, built by Nebuchadnezzar, on the west side of the river. Both these divisions were enclosed by one wall, and the whole formed a complete square, 480 furlongs in compass. Each of the four sides of this square had twenty-five gates of solid brass, at equal distances; and at every corner was a strong tower, ten feet higher than the wall. In those quarters where the city had the least natural defence there were also three of these towers between every two of the gates; and the same number between each corner, and the nearest gate on its two sides. The city was composed of 50 streets, each 15 miles long and 150 feet broad, proceeding from the 25 gates on each side, and crossing each other at right angles; besides four half streets, 200 feet in breadth, surrounding the whole, and fronting towards the outer wall. It was thus intersected into 676 squares, which extended four furlongs and a half on each of their sides, and along which the houses were built at some distance from each other. These intermediate spaces, as well as the inner parts of the squares, were employed as gardens,

pleasure-grounds, &c.; so that not above one half of the immense extent which the walls enclosed was occupied by buildings.

The walls of Babylon were of extraordinary strength, being 87 feet broad, and 350 high. They were built of brick, and cemented by a kind of glutinous earth called bitumen, which had the quality of soon becoming as hard as stone, These walls were surrounded on the outside by an immense ditch, from which the earth had been dug to make the bricks, and which, being always filled with water, added very much to the defence of the city.

On each side of the river Euphrates was built a quay, or high wall of the same thickness with the walls around the city. There were gates of brass in these walls opposite to every street which led to the river; and from them were formed descents, or landing-places, by means of steps; so that the inhabitants could easily pass in boats from one side of the city to the other. There was also a remarkable bridge thrown over the river, near the middle of the city, built with wonderful art of huge stones, fastened together by means of iron chains and melted lead; and it is said to have been a whole furlong in length, and thirty feet in breath.

In order to prevent any inconvenience from the swellings of the Euphrates, two canals were cut from that river at a considerable distance above the town, which carried off the superabundant waters into the Tigris. From the place where these canals commenced, down the sides of the river, both above and below the city, immense banks were constructed to confine the stream still more effectually within its channel, and to prevent still more completely all danger of an inundation. In order to facilitate the construction of these works, an immense lake was dug on the west side of Babylon, about 40 square miles, and 35 feet deep, into which the river was turned by a canal till the banks were completed, and it was then restored to its former course. This lake continued afterwards to receive annually a fresh supply of water from the Euphrates, and was rendered very serviceable, by means of sluices, for watering the lands which were situated below it.

At the two ends of the bridge over the Euphrates were

two magnificent palaces, which had a subterraneous communication with each other, by means of a vault or tunnel under the river. The old palace, on the east side, was about thirty furlongs in compass, and was surrounded by three separate walls, one within the other, with considerable spaces between them. The new palace, on the opposite side, was about four times as large as the other, and is said to have been eight miles in circumference. The walls of both these edifices were embellished with an infinite variety of pieces of sculpture; and among the rest was a curious hunting scene, in which Semiramis was represented on horseback throwing her javelin at a leopard, while her husband, Ninus, was piercing a lion.

The most remarkable structure in the new palace was the hanging gardens, which Nebuchadnezzar is said to have raised, in order to give his wife, Amytis, daughter of Astyages, King of Media, some representation of the beautiful mountainous and woody scenes which abounded in her native country. These gardens occupied a square piece of ground, 400 feet on every side, and consisted of large terraces raised one above the other, till they equalled in height the walls of the city. The ascent from terrace to terrace was by means of steps ten feet wide, and the whole pile was sustained by vast arches, and strengthened on each side by a solid wall, twenty-two feet in thickness. Within these arches were very spacious and splendid apartments, which are described as having commanded a very extensive and delightful prospect. In order to form a proper pavement for supporting the soil, and confining the moisture of the garden, large flat stones, sixteen feet in length and four in breadth, were first of all laid upon the top of the upper arches, over these was spread a layer of reeds, mixed with bitumen; upon this, two rows of brick closely cemented; and the whole covered with sheets of lead, upon which the earth or mould was laid to a sufficient depth for the largest trees to take firm root. In the upper terrace was a large reservoir, into which water was drawn from the river by some species of engine, and kept there ready to be distributed to any part of the gardens.

Near to the old palace stood the Temple of Belus; and in the middle of the temple was an immense tower, about

600 feet in height, and the same number square at the foundation. This huge pile of building consisted of eight towers, each 75 feet high, placed one above the other, and gradually decreasing towards the top like a pyramid. The ascent to the summit was accomplished by stairs on the outside, in a sloping direction, and of a spiral form; and these, winding eight times round the whole, produced the appearance of as many towers regularly contracting their diameter. In the different stories were many lofty apartments, supported by pillars, and used as temples in the worship of Baal; and on the top of all was erected a complete observatory for astronomical purposes. What has been described is understood to have been the old Tower of Babel; but it was greatly enlarged by Nebuchadnezzar, who built around its base a number of other sacred edifices, forming a square nearly three miles in compass. The whole was enclosed by a strong wall; and the various entrances secured by solid gates of brass, which are conjectured to have been formed out of the spoils of the temple at Jerusalem; (Dan., chap. i., v. 2; 2 Chron., chap. xxxvi., v. 7.) In this Temple of Belus, or, as some say, on its summit, was a golden image, 40 feet in height, and equal in value to three millions and a half sterling. There was, besides, such a multitude of other statues and sacred utensils, that the whole of the treasures contained in this single edifice have been estimated at forty-two millions.

The city of Babylon seems to have excelled in rich and ingenious manufactures, at a very early period in the history of the world; and its goodly garments are mentioned 1,450 years before Christ; (Joshua vii. ver. 21; and 2 Sam. xiii. ver. 18.) For the space of 26 years after the death of Nebuchadnezzar, it continued to retain its glory, and was at once the seat of an imperial court, the station of a numerous garrison, and the scene of a most extensive commerce. It was at length invested, about 540 years before Christ, by the victorious armies of Cyrus the Great. Crowded with troops for their defence, surrounded with such lofty walls, and furnished with provisions for twenty years, the citizens of Babylon derided the effects of their besieger, and boasted of their impregnable situation. On the other hand, the conqueror of Asia, de-

termined to subdue his only remaining rival in the empire of the eastern world, left no expedient untried for the reduction of the city. By means of the palm-trees, which abounded in that country, he erected a number of towers higher than the walls, and made many desperate attempts to carry the place by assault. He next drew a line of circumvallation around the city, divided his army into twelve parts, appointed each of these to guard the trenches for a month, and summoned his enemy to surrender. After spending two years in this blockade, he was presented with an opportunity of effecting his purpose by stratagem. Having learned that a great festival was to be celebrated in the city, and that it was customary with the Babylonians on that occasion to spend the night in drunkenness and debauchery, he posted a part of his troops close by the spot where the river Euphrates entered the city, and another at the place where it went out, with orders to march along the channel whenever they should find it fordable. He then detached a third party to open the head of the canal, which led to the great lake already described, and, at the same time, to admit the river into the trenches which he had drawn around the city. By these means the river was so completely drained by midnight, that his troops easily found their way along its bed; and the gates, which used to shut up the passages from its banks, having been left open in consequence of the general disorder, they encountered no obstacle whatever in their progress. Having thus penetrated into the heart of the city, and met, according to agreement, at the gates of the palace, they easily overpowered the guards, cut to pieces all who opposed them, slew the king Belshazzar while attempting to make resistance, and received the submission of the whole city within a few hours. From this period, Babylon ceased to be the metropolis of a kingdom, and its grandeur very gradually decayed. Its citizens were very impatient under the Persian yoke; and their pride was particularly provoked by the removal of the imperial seat to Susa. Taking advantage of the disorders in Persia, in consequence of the sudden death of Cambyses, and of the massacre of the Magians, they continued, during the space of four years, to make secret preparations for a revolt.

At length, in the fifth year of Darius Hystaspes, about 518 years before Christ, they openly raised the standard o rebellion, and thus drew upon themselves the whole force of the Persian empire. Determined upon a desperate defence, and desirous to make their provisions last as long as possible, they adopted the barbarous resolution of destroying all such persons in the city as could be of no service during the siege. Having sacrificed the lives of their friends, and resolutely regardless of their own, they resisted successfully all the strength and stratagems of the Persians, for the space of eighteen months; and fell at length into the hands of Darius, by the following extraordinary instance of fortitude in one of his officers:

Zopyrus, one of the principal noblemen in the Persian court, appeared in the presence of his prince, covered with blood, deprived of his nose and ears, torn with stripes, and wounded in various parts of his body; unfolded to the astonished monarch his design of deserting to the enemy, and arranged his future plan of operations. Approaching the walls of the city, he was carried before the governor, detailed the cruel treatment which he professed to have received from Darius, offered his services to the Babylonians, who were well acquainted with his rank and abilities; acquired their confidence by several successful sallies; obtained at length the chief command of their forces, and thus easily found means to betray the city to his master. As soon as Darius was in possession of Babylon, he ordered its hundred gates and its impregnable walls to be demolished; put to death 3,000 of those who had been principally concerned in its revolt, and sent 50,000 women from different parts of his empire, to supply the place of those who had been so cruelly destroyed at the commencement of the siege. In the year B. C. 478, Xerxes, the successor of Darius, returning from his inglorious invasion of Greece, passed through the city of Babylon: and partly from hatred of the Sabian worship, partly with a view to recruit his treasures, plundered the temple of Belus, of immense wealth, and then laid its lofty tower in ruins. In this state it continued till the year B. C. 324, when Alexander the Great made an attempt to rebuild this sacred edifice, and to restore its former magnificence. But, though he employed about 10,000 men in

this work, for the space of two months, nis sudden death put an end to the undertaking, before the ground was cleared of its rubbish. This mighty city declined very rapidly, under the successors of Alexander; and, in the year 294 A. C. was almost exhausted of its inhabitants by Seleucus Nicator, who built in its neighbourhood the city of Selucia, or New Babylon. It suffered greatly from the neglect and violence of the Parthian princes, before the Christian era; and every succeeding writer bears testimony to its increasing desolation: Diodorus Siculus, B. C. 44; Strabo, B. C. 30; Pliny, A. D. 66; Pausanias, A. D. 156; Maximus Tyrius, and Constantine the Great, as recorded by Eusebius, all concur in describing its ruined condition; and Jerome at length informs us, that, about the end of the fourth century, its walls were employed by the Persian princes as an enclosure for wild beasts, preserved there for the pleasures of the chase. It was visited about the end of the twelfth century, by Benjamin of Tudela in Navarre, who observed only a few ruins of Nebuchadnezzar's palace remaining, but so full of serpents and other venomous reptiles, that it was dangerous to inspect them nearly. A similar account is given by other travellers; by Texeira, a Portuguese; by Ranwolf, a German traveller, in 1574; by Petrus Vallensis, in 1616; by Tavernier, and by Hanway; but so very slight are the vestiges now to be found of ancient Babylon, that it is difficult to ascertain exactly the spot on which it stood; so completely has been fulfilled the prediction of Isaiah: "Babylon, the glory of kingdoms, the beauty of the Chaldees' excellency, shall be as when God overthrew Sodom and Gomorrah. It shall never be inhabited, neither shall it be dwelt in from generation to generation; neither shall the Arabian pitch tent there; neither shall the shepherds make their fold there. But wild beasts of the desert shall be there, and their houses shall be full of doleful creatures, and owls shall dwell there, and satyrs shall dance there, and the wild beasts of the islands shall cry in their desolate houses, and dragons in their pleasant places." The striking accomplishment of Scripture prophecies, in the conquest, decline, and desolation of Babylon, is very fully illustrated by Rollin, and other eminent historians.—BREWSTER'S *Encyclopedia*.

RUINS OF PALMYRA.

All Syria, and perhaps the whole world, does not afford a view of more magnificent ruins than those of Palmyra, which evidently demonstrate its ancient opulence and grandeur.

This city was founded by King Solomon, in the desert of Syria, but it may be supposed, that so advanced a garrison as this, being above 300 miles from Jerusalem, did not continue long in possession of the Jews, who, after Solomon's death, fell into civil dissensions. It undoubtedly submitted to the Babylonian and Persian monarchies, and afterwards to the Macedonians, under Alexander and the Seleucidæ; but when the Romans got footing in those parts, and the Parthians seemed to put a stop to their further conquests in the east, then this city, by reason of its situation, being a frontier town, and in the middle of a vast sandy desert, where armies could not well subsist to reduce it by force, was courted and caressed by the contending princes, and permitted to continue a free state, a mart or staple of trade for the convenience of both empires, as plainly appears from Appian and Pliny. With these advantages of freedom, neutrality and trade, for near two centuries, Palmyra grew wealthy and magnificent, and it was afterwards much adorned and enriched by the Emperor Adrian, to whom it submitted about the year of Christ 130. From the time of Adrian, to that of Aurelian, for about 140 years, this city continued to increase in power and riches, till Zenobia, the wife of Odenatus, and queen of Palmyra, as she is commonly called, having some dispute with Aurelian, after her husband's death, about a share in the empire, he marched against her, and having in two battles routed her forces, he shut her up and besieged her in Palmyra. The city was soon obliged to surrender, and Zenobia flying with her son, was pursued and taken; with which Aurelian being satisfied, he spared the city, and leaving a small garrison in it, marched to Rome with this captive lady; but the inhabitants, being willing to shake off the Roman yoke, cut off the whole garrison, which Aurelian understanding, though he was got into Europe, returned speedily with his army, took the city again without much opposition, put the people to the sword with uncommon cruelty

and delivered it to be pillaged by his soldiers. This calamity befel Palmyra about the year of our Lord 272; and though Aurelian did not then burn or destroy the buildings, yet the damage it sustained was never retrieved, so as to make any considerable figure ever after. In what age, or from what hand it received its final overthrow, which reduced it to its present miserable condition, we cannot gather from history; but it was probably burnt and desolated in the obscure ages of the world, during the wars of the Saracens.

These ruins lie in the desert of Syria, about 150 miles south-east of Aleppo, and have been visited by several of our countrymen, who have carefully examined and described them. By the space they take up, the city appears to have been of vast extent; but there are no vestiges of any walls remaining, nor is it possible to judge of the ancient figure of the place. The present inhabitants are about thirty or forty poor families, who live in little huts made of earth, within the walls of a spacious court, which formerly enclosed a most magnificent heathen temple, dedicated to the Sun. This court is a square of 220 yards each side, encompassed with a high and stately wall, adorned with pilasters both within and without, to the number of sixty-two on a side; and had not the Turks, out of a vain superstition, purposely beat down the beautiful cornices, perhaps the world could not boast of more exquisite carvings, as one may judge from some remaining fragments. The west side, on which is the entrance, is mostly broken down, and near the middle of the square, another higher wall is raised out of the ruins, which appears to have been part of a castle, probably built by the Mamalukes, for the security of the place. Before the whole length of this new front, except a narrow passage left for an entry, there is cut a deep ditch, faced with stone to the foot of the wall, which must have made it difficult to be assailed. This wall entirely shrouds the magnificent entry that belonged to the first fabric, of the stateliness whereof we may form some idea from the two stones that support the sides of the great gate, each of which is 35 feet high, both standing, and beautifully covered with vines and clusters of grapes, exceedingly bold and natural.

As soon as we enter within the court, we see the re-

mains of two rows of very noble marble pillars, 37 feet high, with capitals of admirable workmanship. About fifty of these only remain entire; but there must have been many more, for they appear to have run quite round the whole court, and to have supported a very spacious double piazza, or cloister. The walk on the west side of this piazza, which is opposite to the front of the temple, seems to have exceeded the rest in breadth and beauty; and at each end are two niches for statues at their full length, with their pedestals, borders, supporters, and canopies, all carved with the greatest art and curiosity.

In the middle of this once beautiful enclosure, but now filled with the dirty huts of the inhabitants, stood the Temple of the Sun, encompassed with another row of pillars of a different order, and much taller than the former, being about fifty feet high; of which only sixteen are now remaining. The space included within these pillars was fifty-nine yards in length, and about twenty-eight in breadth; and the temple was thirty-three yards long, and fourteen or fifteen broad, pointing north and south, with a magnificent entry on the west, exactly in the middle of the structure. The outward walls of this temple are still standing, in which it is observable, that the windows are narrower at the top than the bottom, and not very large, but all adorned with excellent sculptures. Just over the door any one may discern part of the wings of a large spread eagle, extending its whole width, which made Mr. Halifax at first imagine it might have been rather a cherub overshadowing the entrance, there being nothing of the body remaining to guide one's judgment, but afterwards, seeing other eagles on stones that were fallen down, he concluded this must have been one likewise, only of a much larger size. Never were vines, bunches of grapes, and the other sculptures in general, executed in so bold and lively a manner; and every thing to be seen about the small remains of this temple, induces us to believe it was once a most glorious structure.

The Turks, or rather the Mamalukes, have built a roof to these walls, supported by small pillars and arches, but a great deal lower, and in other respects disproportionate to what the ancient covering must have been; and they have converted it into a mosque, adding to the south end

new ornaments after their manner, with inscriptions and sentences out of the Koran, written in wreaths and flourishes; but at the north end of the building, which makes no part of the mosque, there are remains of much greater art and beauty, viz., the most curious fret-work and carvings. In the middle of the roof is a dome or cupola, about two yards in diameter, made of some artificial composition, which is, however, an admirable piece of workmanship.

After viewing this temple, our author went to another situation, where he had a prospect of such stately ruins, that if one may frame an idea of the original beauty of Palmyra, by what is still remaining, it may be questioned whether any city in the world could have vied with it in magnificence. Advancing towards the north, we have before us a fine obelisk, about 50 feet in height, consisting of seven large stones, besides its capital and the wreathed work about it. Its circumference just above the pedestal is four yards six inches, and its sculptures, as in other places, are extremely beautiful; but it has no statue on the top of it, as probably it had formerly. About a quarter of a mile distant from this, two other large pillars are to be seen, the one towards the east, and the other towards the west; which would incline one to think there was a continued row of them.

Proceeding forwards, about 80 yards from the obelisk, we come to a large and lofty entry, which, for the beauty of the workmanship, is not inferior to any thing before described, and leads into a noble piazza or portico, above half a mile in length, and 40 yards in breadth, enclosed within two rows of stately marble pillars, 26 feet in height, and eight or nine in circumference. One hundred and twenty-nine of these are standing and entire, but, upon a moderate computation, there could not have been less originally than five hundred and sixty. This spacious piazza was terminated by a row of pillars, standing somewhat closer than those on the sides; and perhaps there might have been a sort of banquetting-house above, or else a stately building, whose ruins lie at a little distance to the left, might have been allotted to that use, being built of fine marble, and having an air of delicacy in the workmanship beyond what is discernible in the piazza. The

pillars that supported it are of one entire stone: and one of them, that was fallen down without breaking, measured 22 feet in length, and 8 feet 9 inches in circumference.

On the west side of the great piazza are several gates leading into the court of the palace, two of which, when in their perfection, must have been exceedingly magnificent and beautiful, not only for the elegance of the work in general, but in particular for the noble porphyry pillars with which they were adorned, each gate having four in its front, two on one hand, and two on the other. There is only one of these now standing in its place, though there is another entire; they are about 30 feet high, and 9 in compass, and so exceedingly hard, that a piece cannot be broken off without great difficulty. The palace itself is so entirely ruined, that no judgment can be formed of what it was when standing, either as to its figure or workmanship; but it was certainly answerable to the splendour of the city.

On the east side of the long piazza stands a vast number of marble pillars, some perfect, and others deprived of their beautiful capitals, but so scattered and confused, that it is not possible to reduce them to any order, so as to conjecture for what purpose they originally served. In one place we find several of them arranged in a square, paved at the bottom with broad flat stones, but without any roof or covering; and at a little distance from thence are the remains of a small temple, which seems to have been of curious workmanship, but the roof is quite gone, and the walls are much defaced and consumed. Before the gate of it, there remains a piazza, supported by six pillars, two on each side of the door, and one at each end; and the pedestals of those in the front have been filled with inscriptions, which are now defaced and illegible.

The sepulchres of Palmyra are worth the attention of the curious; being square towers four or five stories high, standing on each side of a hollow way, towards the north part of the city. They extend in length, the space of a mile, and perhaps anciently they might extend a great way farther. They are all of the same form, but different in magnitude and splendour, according to the circumstances of their founders. Two of these sepulchres are

more entire than the rest, though not without marks of the Turkish fury, as well as the injuries of time. They are rather larger than our common church steeples, and five stories high, the outside being of ordinary stone, but the partitions and floors within of good marble, and adorned with lively sculptures and paintings, and the busts of men and women, most of them defaced and broken. Under these busts, or on the sides of them, are some inscriptions in an unknown character, being probably the names of the persons there deposited. One of these sepulchres has a door on the south side, from whence there is a walk across the middle of the building, and the floor being broken up, affords a view of the vaults below. The spaces on each hand are divided by thick walls into six partitions, each capable of receiving the largest corpse; and if piled one upon another, as their method seems to have been, each of those partitions might contain six or seven bodies. In the lowest, second, and third stories, these partitions are uniform, except that from the second floor one partition is reserved for a stair-case. In the upper floors, the building being somewhat contracted towards the top, there is not room for a continuation of the same method: and therefore the two highest stories are not so divided, nor perhaps ever had any bodies laid in them, unless that of the founder, whose statue, in a recumbent posture, is placed in a niche, in the front of the monument, so as to be seen within and without, and near this statue is a Greek inscription. The other monument is similar, only the entrance and front are towards the north, and the paintings are not so fine; but the carvings are as good, and the whole looks as stately as the former. Besides, it has the advantage with respect to age, being not so old as the other by a hundred years, as appears from the date of an inscription over a niche in the front.

From these sumptuous mausolea, and other magnificent structures, our author thinks it reasonable to conclude, that the Palmyrenes were a potent and opulent people before they became subject to the Romans, and that they were not altogether indebted to them for their greatness—SMITH'S *Wonders.*

RUINS OF BALBEC.

Next to the ruins of Palmyra, there are none which more attract the attention of travellers than those of Balbec, a town about 30 miles north of Damascus, supposed to be the ancient Heliopolis, so called from an image of the sun, which was worshipped by its Pagan inhabitants. The present town, which was destroyed by an earthquake, in November, 1759, was of a square form, about a mile in compass, surrounded by a wall of considerable strength, which had been built out of the ruins of the ancient city; but the houses were very mean, such as are usually met with in Turkish villages. On the south-west side of the town were the noble remains of an heathen temple, with some other magnificent buildings; but in later times these old structures have been patched and pieced, some additions made to them, and the whole converted into a castle. The additional buildings were in no mean taste, but yet the modern architecture was easily distinguished from the ancient.

The first thing observable among those venerable remains of antiquity, as they stood before the earthquake, was a rotunda, or round structure, encompassed with beautiful pillars of the Corinthian order, which supported an elegant cornice. Though round on the outside, it was octagonal within, having eight arches supported by eight Corinthian columns, each of one single piece. It was mostly of marble, and was of late open at the top, but appeared to have been covered with a shell, and to have been embellished with some figures of eagles. In a word, the whole was very elegant and stately; but the Greeks, who ventured to use it as a church, though it was in a tottering condition, had spoiled the beauty of the inside by daubing it with plaster.

Beyond the rotunda was a large and lofty pile of building, composed of vast square stones, and leading into a stately piazza or portico, 150 paces in length, which opened to the temple before-mentioned. The temple had surprisingly withstood the injuries of time, and escaped the fury of superstition, the body of it being almost entire. It was an oblong square, and as to its form and propor-

tion, it very much resembled the church of St. Paul, Covent-garden, at London, but in dimensions and other respects the Balbec temple was very superior. Its length, measured on the outside, was 192 feet, and its breadth 96: within it was 120 feet long, and 60 broad. The pronaos, or anti-temple, had long tumbled down, the pillars that supported it being broken. The body of the temple was surrounded by a noble portico, sustained by pillars of the Corinthian order, each of which consisted of three stones, being about 50 feet high, and more than six in diameter. These pillars were three yards distant from each other, and as much from the wall of the temple, fourteen of them being on each side, and eight at the end, reckoning the corner pillars twice over. They had a stately architrave running round their capitals, with a cornice admirably carved. The covering of the portico consisted of large hollow stones, which formed an arch, extending from the pillars to the wall of the temple; and in the centre of each stone was the figure of a deity or hero, but most of them so defaced as not to be easily distinguished. There was a Mercury, indeed, that had received but little injury, and an eagle flying away with Ganymede, both carved with all the life imaginable. A continued bas-relief, in miniature, ran round the foot of the wall of the temple, on a marble border, representing various ceremonies of the heathen worship, in which there was a surprising mixture of figures, both of men and beasts, but without the least confusion.

Nothing could be more grand than the entrance into this magnificent edifice, the ascent being by thirty steps, bounded on each side by a wall, which terminated in a pedestal, whereon was formerly placed a statue. Eight Corinthian pillars, with a large triangular pediment, composed the front, and within these pillars, at about two yards' distance, were four others; and also two pillars of three faces each, which altogether formed a portico before the door of the temple, 24 feet in depth, and upwards of 60 in breadth. The door of the temple appeared to the utmost advantage through these pillars, their nice proportions, their distance from each other, and the recess of the door itself, all contributing to make it look majestic. The door-case or portal was about 40 feet high, and 28 wide; and, as to construction and proportion, resembled the

great portal at the west end of St. Paul's cathedral at London, but far excelled it in the richness of its sculptures. The bas-relief over-head, was an admirable piece of sculpture, and though much injured, still discovered inimitable beauties. It was a large eagle with his wings expanded, carrying a *Caduceus* (Mercury's rod or wand entwisted with two serpents,) in his talons, and holding in his beak the strings or ribands coming from the ends of two festoons, the other ends being supported by two flying Fames; the whole done in the most exquisite manner.

The inside of this temple was divided into three aisles somewhat like our churches, the broadest being in the middle. These were formed by two rows of fluted Corinthian columns, above three feet in diameter. Each row consisted of six columns, which stood about 18 feet distant from each other; and 12 from the walls of the temple. All round the walls were two rows of pilasters, one above another, and between the pilasters were tall niches that seemed to have been designed for images. Of those pilasters there were eight in a row on each side, and nine niches, the bottom of which were upon a level with the bases of the pilasters, and the wall to that height was wrought like a Corinthian pedestal, the same order having been exactly observed in the niches themselves. Near the west end of the middle aisle there was an ascent of 12 marble steps, to a part of the temple distinguished from the rest by two large square columns adorned with pilasters, forming a noble entrance corresponding to that of the temple itself. This part, for want of a proper name, was called the choir; and it is supposed here was formerly a partition, and that the two pillars supported a canopy. There was a large marble niche at the bottom of this choir, which was undoubtedly the place of the principal idol anciently worshipped in this temple. All round this part of the structure there was a vast profusion of excellent sculpture; on one hand, fruits, flowers, festoons, birds, and the like; on the other, Neptune, Tritons, fishes, and other marine figures. The roof of the temple was very bold, and adorned with beautiful carvings. In short, the fabric, as it lately appeared, struck a spectator with astonishment, and gave the most just ideas of the magnificence of the ancient architecture.

An old wall, which encompassed the stately remains we have been describing, was built of stones of such a prodigious size, that those of our famous Stonehenge are are not to be compared with them; and the whole was so surprising and difficult to be accounted for, that the natives of Balbec, as is usual with the vulgar in such cases, believed it to be the work of the devil. Three of the largest of these stones, lying end to end in the wall, are 183 feet in length, one of them being 63 feet long, and the other 62 a-piece. They are 12 feet deep, and their breadth the same; and what is more astonishing, they were raised up into the wall above twenty feet from the ground. These are the largest that travellers have taken notice of, but the other stones of this wall are of a prodigious size.

Within this enclosure, at a small distance from the temple above described, were the ruins of a stately palace, as it is supposed to be, of which our travellers have taken very little notice. Going through the arched portico already mentioned, the first striking object was a spacious hexagonal building or wall, which forms a kind of theatre, being open at one end, with a terrace, to which there was an ascent by steps of marble. This opened into a square court, larger than the former, and encompassed with more magnificent structures. On each hand there was a double row of pillars, which formed porticos above 130 yards long, and 16 broad; and at the bottom of the court there was a large and sumptuous structure, which seemed to have been the body of the palace, as one may judge by the columns belonging to this part, nine whereof were lately standing, which were of a vast size, each consisting of one stone, and of the Corinthian order. We could not behold the remaining vestiges of this palace without admiration, wherein we saw a vast variety of ornaments, without any of the extravagant mixtures introduced in later ages. Here were busts and statues without number, well-wrought niches, trophies, bas-reliefs, incrustations; and, in a word, so many valuable remnants of ancient architecture and sculpture, as show that the taste of Greece and the magnificence of Rome were united in this palace. The great vaults underneath it were no less surprising, for through the ruins one may discern long flights of marble stairs, some of them containing near

two hundred. The bold turn and elevation of these vaults are also wonderful; and the walls have been adorned with bas-reliefs and inscriptions in Roman characters, but the dampness of the place and length of time have rendered them illegible. Some of the vaults receive light from large windows, that are level with the surface of the ground above; but others are quite dark, and cannot be viewed without torches or candles, either because of their great depth, or because the passages, originally made to give them light, are now filled up with rubbish.

At a short distance from the walls of the city is a quarry of free-stone, from which the immense stones employed in the body of the great temple were probably taken, while the ornamental parts of those buildings were supplied by a quarry of coarse white marble, at a great distance to the west of the city. There are still remaining in the first quarry some vast stones cut and shaped for use. One of them thus shaped, but not entirely detached from the quarry at the bottom, is 70 feet long, 14 broad, and 14 feet 5 inches deep, whence it must contain 14,128 cubic feet; and were it Portland-stone would weigh about 2,270,000 pounds avoirdupois, or about 1,135 tons.

The inhabitants of this country confidently maintain, that both Balbec and Palmyra were built by Solomon; and it is probable, that his character, as a wise and yet voluptuous prince, may have given rise to an opinion, which, with respect to Balbec at least, seems to have scarcely any other foundation; for nowhere could an eastern monarch enjoy a more luxurious retirement than amidst the streams and shades of Balbec. The natives relate many stories of the manner in which he spent his hours of dalliance in this retreat; a subject on which the warm imagination of the Arabs is apt to be too particular.—Smith's *Wonders.*

RUINS OF HERCULANEUM AND POMPEII.

An inexhaustible mine of antique curiosities exists in the ruins of Herculaneum, a city lying between Naples and Mount Vesuvius, which, in the first year of the reign of Titus, was overwhelmed by a stream of lava from the neighbouring volcano. This lava is now of a consistency

which renders it extremely difficult to be removed, being composed of bituminous particles, mixed with cinders, minerals, and vitrified substances, which altogether form a close and ponderous mass. In the revolution of several ages the spot it stood upon was entirely forgotten; but, in the year 1713, it was accidentally discovered by some labourers, who, in digging a well, struck upon a statue on the benches of the theatre. Several curiosities were afterwards dug out, and sent to France, by the Prince of Elbauf; but the search was soon discontinued, and Herculaneum remained in obscurity till the year 1736, when the King of Naples employed men to dig perpendicularly eighty feet deep; whereupon not only the city made its appearance, but also the bed of the river which ran through it. In the Temple of Jupiter was found a statue of gold, and the inscription that decorated the great doors of entrance. In the theatre were some fragments of a gilded chariot of bronze, with horses of the same metal, which had been placed over the principal entrance. On a balustrade, which divided the orchestra from the stage, was found a row of statues; and on each side of the pulpitum stood an equestrian figure of a person of the Nonian family.

A great variety of curious articles have also been found in other parts of this city, which are now arranged in a wing of the palace at Naples, and consist not only of statues, busts, altars, inscriptions, and other appendages of opulence and luxury, but also comprehend a complete assortment of domestic, musical, and surgical instruments: tripods, of elegant form and exquisite execution; lamps and chandeliers in endless variety; pateras, and other appurtenances of sacrifice; mirrors of polished metal, silver kettles, cisterns for heating water, and various culinary utensils; a lady's toilet, furnished with combs, thimbles, rings, paint, ear-rings, &c. &c. Two statues, representing a Mercury and a Sleeping Faun, are particularly admired by connoisseurs; and several rooms are filled with handsome busts. The fresco paintings, which for the sake of preservation have been framed and glazed, are deposited in another part of the palace. A large parcel of manuscripts were also found among the ruins, and very sanguine hopes were enter-

tained, by the literati, that many works of the ancients would be restored to light, and that a new mine of science was on the point of being opened; but the difficulty of unrolling the burnt parchments, of pasting the fragments on a flat surface, and of deciphering the obscure letters, have proved such obstacles, that very little progress has been made in the work.

The streets of Herculaneum appear to have been perfectly straight and regular; the houses well built, and generally uniform; and the rooms paved either with large Roman bricks, mosaic work, or fine marble. It appears that the town was not filled up so unexpectedly with the melted lava, as to prevent the greatest part of the inhabitants from escaping with their richest effects; for there were not more than a dozen skeletons found, and but little gold or precious stones.

The town of Pompeii was involved in the same melancholy catastrophe with Herculaneum; but it was not discovered till near forty years after the finding of that place. One street, which has been entirely cleared, is paved with the same kind of stone of which the ancient roads are made; and narrow causeways are raised about eighteen inches on each side for foot passengers. Dr. Moore observes, that the street itself is not so broad as the narrowest part of the Strand in London, and is supposed to have been inhabited chiefly by tradesmen. The houses are small, but neat and convenient; the stucco on the walls is smooth and beautiful; and some of the rooms are ornamented with paintings, which appear extremely fresh, and tolerably well executed. In one part of the town is a rectangular building, with a colonnade toward the court, somewhat resembling the Royal Exchange in London; and at a considerable distance is the temple of the goddess Isis, the pillars of which are of brick stuccoed; but there is nothing very magnificent in the appearance of this edifice. Few skeletons were found in the streets of this town; but in the houses there were many, in situations which plainly proved that they were endeavouring to escape when the tremendous torrent of lava overtook them.—SMITH'S *Wonders*.

RUINS OF PERSEPOLIS.

RUINS OF PERSEPOLIS.

The magnificent ruins of the palace of Persepolis, destroyed by Alexander the Great, at the persuasion of Thais, the Athenian courtezan, are too curious to be here omitted. There are still some remains of this ancient structure, the residence of former kings of Persia. It was once scarce inferior to any palace in the world in splendour and magnificence; and there are now to be seen broken walls adorned with sculpture; stair-cases of vast extent, and pillars of a very different form from any of the orders of architecture, that declare the height of the fallen roofs. These ruins are about thirty miles to the north of Schiras, and are seated in a plain, partly encompassed by a range of mountains. The front extended 600 paces from north to south, and 390 from east to west. The stones of the wall are black and harder than marble, some finely polished; and many of them of such a surprising size, that it is difficult to conceive how the ancient Persians were able to raise and move such prodigious masses. Several grand portals are still standing, adorned with columns and basso-relievos; and there are still to be seen a great number of pedestals, from which the columns have fallen. In short, these ruins have an air of grandeur and magnificence, that fill the mind of the curious beholder with astonishment.

The royal palace was a structure of such beauty and magnificence, that perhaps it was never exceeded by any. It stood on a rocky hill, and took up fifty acres of ground being surrounded, according to Diodorus Siculus, with a triple wall, the first of which was sixteen cubits high, the second double that height, and the innermost sixty cubits, all built of marble. The palace itself was of a square form, and on each side had brazen gates. The halls and apartments were exceedingly spacious and lofty; the walls of them adorned with noble sculptures, some of which still remain to testify its ancient splendour; and the cedar roofs shone with gold, silver, ivory, and other precious materials. The royal throne was of pure gold, embellished with pearls and precious stones; and the furniture of the chambers was rich beyond description; the bed-

steads being of solid gold enriched with gems; and every thing else proportionably sumptuous. Its glory, however, did but procure its destruction; for, at the great feast which Alexander held in it, he was persuaded by Thais, the Athenian courtezan, that it would be a noble exploit to burn so fine a palace; which, being heated with wine, he readily agreed to. Thus this superb edifice, together with the city, which for several ages had been the seat of the Persian monarchs, was soon reduced to a heap of ruins, which are still to be seen about thirty miles to the north of Schiras, and exhibit evident tokens of its former magnificence.

The lofty columns, yet standing, declare the height of the fallen roofs; and the stairs show that the apartments they led to were much superior to any thing in our modern palaces. These magnificent remains appear as in a kind of amphitheatre, surrounding mountains forming a half moon, as if it were to embrace them; they are seated in a fine plain, that extends two leagues in breadth, and near forty leagues in length. That superb edifice has the walls of three of its sides still standing. The front extends 600 paces from north to south, and 390 from east to west; it is situated at the foot of a mountain, anciently called the Royal Mountain, where an ascent is formed between some scattered rocks; beyond which there appear to have been formerly some other buildings.

The top of this edifice presents to view a platform of 400 paces, extending from the middle of the front wall to the mountain: and along three sides of this wall is carried on a pavement of two stones, joined together, eight feet broad: with respect to the height of the wall, it is in some places twenty-four feet. The stones are black, harder than marble, some of them finely polished, and many of them of such an amazing size, that it is difficult to conceive how such prodigious masses were ever raised by human industry.

The principal staircase is placed between the middle of the front and the northern end of the edifice; it consists of two flights of steps, that wind off from each other to the distance of forty-two feet at the bottom. These steps are only four inches high, and fourteen in breadth; there are fifty-five of them on the northern side, and fifty-three on

the south; and there are several others under ground, that have been covered over by length of time, as well as part of the wall, which rises forty-four feet eleven inches high in the front. At the bottom of these two flights of steps is a single flight, extending fifty-one feet four inches from one to the other; from thence the two flights are carried off from each other, and return back from the centre, at an equal distance from the extreme parts of the top; and above these flights is a pavement of large stones, and another single flight of steps, seventy-five feet in width, answering to that at the bottom, and leading up to the grand entrance of the edifice. This staircase has a very fine and singular effect, and is perfectly correspondent with the magnificent remains of the rest of the building.

On ascending the upper steps, a spectator sees before him, at the distance of forty-two feet from the front wall of the stair-case, two grand portals, and two columns. On the inside, upon a kind of pilaster, on each hand, is a large figure in basso-relievo, which bears some resemblance to the sphinx. Each figure is twenty-two feet from the fore to the hinder legs, and fourteen feet and a half high. The faces of these animals are broken off, and their bodies much damaged; but what is most extraordinary is, the breast and fore part project from the pilaster. Indeed, it is impossible to know what these figures thus mutilated were designed to represent. On the upper part of the pilasters are characters, which, from their smallness and elevation, it is impossible to distinguish. The two columns that appear between the portals are the least damaged of all, particularly with respect to their capitals and the other ornaments of their upper parts: but the bases are entirely covered with earth. They are fifteen feet in circumference, and rise to the height of fifty-four feet.

At the distance of fifty-two feet south of the same portal, is a large basin for water, cut out of a single stone, twenty feet long, and seventeen feet five inches in breadth; and raised three feet and a half above the surface of the floor. Proceeding southward from the portals already described, you see two other flights of steps, resembling the former; the one to the east, the other to the west. On the upper part, the wall is embellished with foliage, and

the representation of a lion rending a bull, in bas-relief, much larger than life. From hence extends a wall forty-five feet in length, beyond the lower part of the stair-case; and there is an interval of sixty-seven feet, extending to the western front, which corresponds with the other, and has three ranges of figures, one over the other, with a lion tearing an ass, that has a horn projecting from the forehead; and between these animals and rows of figures, is a square filled with antique characters, the uppermost of which are defaced. On the other side of the stairs are three ranges of small figures; but those in the upper row are only visible from the waist downwards; these figures are only two feet nine inches high, and the wall, which is five feet three inches in height, has an extent of ninety-eight feet.

On the top of the steps last described, is an entrance into an open place paved with large stones, whose breadth is equal to the distance from the stair-case to the first columns, which comprehends a space of twenty-two feet two inches. These columns are disposed into two ranges, each of which consist of six pillars, but none of them are entire. At the distance of seventy feet eight inches, there were formerly six rows of other pillars, each row consisting of six; these thirty-six pillars were likewise twenty two feet two inches distant from each other, but only seven of them are now entire; all the bases of the others, however, are standing.

At the distance of about seventy feet from these rows of columns, on the west, towards the front of the stair-case, were once twelve other columns in two ranges, each of which contained six, but only five are now remaining; the ground is covered with fragments of columns; and the ornaments that served for their capitals; between which are pieces of sculpture, representing camels on their knees. On the top of one of these columns is a compartment representing camels in the same posture.

Towards the east are several magnificent ruins, consisting of portals, passages, and windows; the insides of the portals are adorned with figures in bas-relief: these ruins extend 90 paces from east to west, 125 from north to south; and are 60 paces both from the columns and the mountains. In the middle of these ruins the earth is

covered with 76 broken columns, 19 of which still support their entablature; their shafts are formed of four pieces, besides the base and capital. At the distance of 118 feet from these columns to the south, is an edifice that rises higher than any other part of the ruins, from its being situated on a hill. The front wall, which is five feet seven inches high on that side, is composed of a single range of stones, some of which are eight feet deep; and the wall extends 113 feet from east to west, but has neither figures nor any other ornaments: in the middle of the front, however, are the ruins of a double stair-case, on the sides of which are several figures; but the rest of the building was chiefly composed of large and small portals, and is entirely destroyed. The largest of these portals is five feet wide, and five feet two inches deep. Among the rest, two portals appear to the north, with three niches or windows walled up. Under these are the figures of a man and two women down to the knees; but their legs are covered with the earth that is raised against them: under the other gate is the figure of a man holding a lion by the mane. To the south is a portal and four open windows, each of which are five feet nine inches wide, and eleven in height, including the cornice; their depth is equal to that of the grand portals. The two sides of this gate are carved with the figure of a man having something on his head resembling a tiara. He is accompanied by two women, one of whom holds an umbrella over his head. On the inside, three niches are covered with ancient Persian characters.

There are two other gates to the west that are not covered; within one of these is the figure of a man fighting a bull; with his left hand he grasps a horn in his forehead, while with his right he plunges a dagger into his belly. On the other side, the figure of another man clasps the horn with his right, and stabs the beast with his left. The second portal has the figure of a man carved in the same manner, with a winged deer that has a horn in his forehead.

Behind this edifice are the ruins of another, which exceed it in length by 38 feet. It has also niches and windows, the former of which are cut out of single stones. A little to the south is a double flight of steps, separated by walls, embellished with small figures and foliage; farther

to the south are subterranean passages, which appear to have been the remains of an aqueduct; and still farther to the south, are the remains of another edifice, which extend 160 feet from north to south, and 191 from east to west. Ten portals belonging to it are still to be seen; together with seven windows and 40 enclosures that were formerly covered with rooms. In the middle are the bases of 36 columns in six ranges, and the ground is covered with large stones, under which were aqueducts.

There anciently stood another structure to the westward of the last-mentioned building. On the ruins of the wall, which still rises near two feet above the pavement, are some figures of men in bas-relief, each represented with a lance. The ground enclosed by this wall contains a number of round stones, that were the bases of columns. On the east side of these last ruins are the remains of a beautiful stair-case, 60 feet in length, resembling that of the front wall; but though most of the steps are destroyed by time, the wall that separates the two flights is still eight feet in height, and adorned with characters, and figures almost as large as life. Columns were formerly disposed between this edifice and the other last mentioned: among these ruins are four portals, each adorned on the inside with the figure of a man, and two women holding an umbrella over his head.

A little to the north of the two last edifices, are two portals with their pilasters, on one of which is the figure of a man and two women, one of whom holds an umbrella over his head. Above these women is a small figure with wings, which are expanded on the sides of the portico. Over the second figure a man is seated in a chair, with a staff in his hand, and another stands behind him with his right hand upon the chair. A small figure above holds a circle in his left hand, and points to something in his right. Under this portal are three ranges of figures, all of which have their hands lifted up: and over the third pilaster which remains, two women hold an umbrella over the head of a man. The earth is also covered with fragments of columns and other antiquities.

From hence we proceed to the last ruins of the structures, on the mountain. On the south side are two portals, under each of which a man is seated in a chair,

with a staff in his right hand, and in his left a kind of vase. Behind him is another figure, which bears something on his head like the tail of a sea-horse, and holds a linen cloth in his right hand. Below are three rows of figures with lifted hands, four in the first, and five in each of the other two rows. Above these are several ornamental ranges of foliage, the lowest of which is intermixed with small lions, and the highest with oxen; and over them is a little winged figure, which holds in his left hand something that resembles a small glass, and makes a signal with his right. These portals are ornamented with several other figures, of which a description might be tedious.

There are two ancient royal tombs near the mountain, one to the north, and the other to the south, both of them hewn out of the rock, and both noble fragments of antiquity. Their fronts are covered with figures and other ornaments; the form of both is nearly the same, and therefore a description of that to the north will be sufficient.

That part of the tomb on which the figures are carved is 40 feet wide, the height is almost equal to the width below, and the rock extends on each side to the distance of 60 paces. Below, a range of four columns support the entablature on their capitals, each of which is composed of the heads of two oxen, as far as the breast, with the fore legs bent on the top of each column. The gate, which is surrounded with ornaments, is placed between two of these columns in the middle, but is at present almost closed up. Above the columns are the cornice and entablature, adorned with eighteen small lions in basrelief, nine on each side, advancing towards the middle, where there is a small ornament resembling a vase. Above the lions are two ranges of figures almost as large as life, fourteen in each range, armed, and lifting up their hands, as if to support the building above them; and on the side is an ornament somewhat in the form of a pillar, with the head of some animal that has only one horn. Above this is another cornice ornamented with leaves. On the left hand, where the wall projects, are three rows of niches one above another, each of them containing two figures armed with lances, and three others on the side armed in the same manner. There are likewise two on the right

side, with their left hands placed on their beards, and the right on their body. On the side of these are three others in the same disposition as those on the other side. At some distance below, and between these figures and an ornament that has some distant resemblance of a round pillar, is another figure on each side, very much impaired. Above, on three steps, stands a figure pointing at something with his right hand, and holding a kind of bow in his left. Before him is an altar, on which an offering is made, from whence the flames are represented ascending. Above this altar appears the moon; and it is said, that there was once a sun behind the figure, but nothing of it is now to be seen. In the middle, and above all this, appears a small mystic figure, that is also to be seen in several parts of the other buildings.

CASCADES, FOUNTAINS, CATARACTS, SPRINGS, *&c.*

THE FOUNTAIN OF VAUCLUSE.

This fountain, one of the most celebrated in Europe, is situated about five miles from Avignon; its waters are sweet and limpid, but it is only accessible by passing over frightful precipices. Its vicinity is covered with beautiful woods, whose cool refreshing shades breathe delicious odours. Near this fountain was the residence of the celebrated Italian poet, Petrarch, whose verses are full of fire and pathos. He sung by turns, his fair mistress, Laura, the fountain of Vaucluse, and his beautiful hermitage. Laura was equally admired for her virtue and talents, as the graces of her person. The name of Petrarch, naturally calls to mind that of Laura, Vaucluse, the sweets of friendship, the pleasures of retirement, and the Muses.

The fountain of Vaucluse flows from a vast cave, at the foot of a rock, of an amazing height, and perpendicular as

a wall. This cavern, where the hand of man never laboured, is 100 feet high, and at least as much in extent; it forms a double cave, the exterior measures 60 feet in height, at the entrance; the interior 30. Here reigns a dread silence, and utter darkness, which inspires involuntary horror. In this second cavern there is a sheet of water, so pure, that we could not find (observes a celebrated traveller) by the light of our torches, the rock along which it passes in the least discoloured.

Some daring persons, in the beginning of the last century, ventured in a small boat to sound this vast gulf; but they were unsuccessful, probably because the strength of the water carried the lead still towards the surface. A few steps from the outward cavern, the fountain finds an extensive issue, whence it rushes with impetuosity over great rocks, forming various cascades, till, meeting no obstacle, it divides gently into two large branches, in the midst of a beautiful country, and at last falls into the Rhone, under the name of the Jorque.

FOUNTAIN AT PEROUL.

THERE is a remarkable fountain at Peroul, near Montpelier, in Languedoc, which boils up furiously in small bubbles. This manifestly proceeds from a vapour breaking out of the earth; for upon digging near it, and pouring water upon the place newly dug, the same bubbling immediately ensues: and in several dry places thereabouts, are found small ventiducts, or spiracles, at which a steam issues forth, strong enough to remove light bodies, such as straws, leaves, or feathers. It is observable, that this vapour does not take fire upon the application of a lighted candle, like the fumes emitted from the boiling spring near Wigan, in Lancashire.

FOUNTAIN AT PLINANIA.

AT Plinania, in the country of the Grisons, is a singular fountain, which bursts from a rock, and falls in natural

cascades into the lake of Como. This spring ebbs and flows thrice every day, with surprising regularity, except in stormy weather. From being almost dry, it gradually rises till it forms a considerable stream, and then as gradually subsides, till the period of its swell returns. Pliny's description of its ebb and flow is written upon the wall of an adjoining apartment.

CURIOUS SPRING, NEAR THE LAKE OF COMO.

In the vicinity of Rosiniere is a curious spring, which rises in the centre of a natural basin, about 12 feet square; the force that acts upon it must be prodigious, for after a shower of rain, it throws up a column of water, as thick as a man's thigh, nearly a foot above its surface. Its temperature is invariable, its surface clear as crystal, and its depth unfathomable. Many persons suppose it to be the end of some subterraneous lake, that has here found an issue for its waters.

BEAUTIFUL CASCADE IN THE GARDENS AT CHATSWORTH.

Near the south and south-east sides of the house, are those water-works, which, about sixty years ago, gave the gardens of Chatsworth extraordinary celebrity. The principal of these is a cascade, which consists of a series of steps, extending a considerable distance down a steep hill, crowned at the top by a temple, that is supplied with water from a very capacious reservoir. This fane (says Mr. Warner) should be dedicated to Mercury, the god of deceit, as a piece of roguery is practised upon the incautious stranger within its very sanctuary; from the floor of which a multitude of little fountains spout up, while he is admiring the prospect from the portal, and quickly wet him to the skin. When this cascade is put in motion, the water rushes with prodigious force from the roof and ornaments of the temple, and falling into a basin in front of the build-

ing, is thence discharged down the flight of steps. Among the other curiosities of this nature are a triton and some sea-horses, from whose heads small streams issue; a fountain, which throws up water to the height of 90 feet; and a copper tree, representing a decayed willow, from every leaf of which water is made to issue, by the turning of a cock, so as to form an artificial shower.—SMITH's *Wonders*

THE FALL OF STAUBBACH.

AT Lauterbruennen, in Switzerland, is a celebrated torrent, called the Fall of Staubbach, which rolls perpendicularly from so vast a height, as to resolve itself into a fine spray, resembling a cloud of dust, and from this appearance it takes its name which means a *spring of dust.* The greatest part of the water falls clear over the overhanging mountain during its whole descent; but the remainder dashes, about half way, against a projection of the rock, and flies off with great violence. The perpendicular height is said to be about 930 feet. When the sun shines in an opposite direction, a small rainbow is reflected toward the bottom of the fall, which gradually diminishes as the spectator approaches.

REMARKBALE CASCADES IN SWITZERLAND.

ON the west side of a lake near Weddenschweil is a cascade, which, bursting from surrounding trees, falls a few feet on the ridge of rock, and then precipitates itself in mid-air for about 50 feet, without touching the sides of the precipice. The effect is peculiarly striking; nor can a contemplative spectator sufficiently admire the vast amphitheatre of rock, the sun-beams playing on the falling waters, and the noise of the torrent, contrasted with the tranquil beauties of the adjacent lake.

The cascade of Arpenas, in the neighbourhood of Magland, rushes from an impending rock, with a fall of 300 feet perpendicular: it is divided into an almost imperceptible spray; and afterwards collecting itself, trickles down

the sides of the mountains in a thousand little streams. Mr. Cox observes, that this body of water is much more considerable than that of Staubbach, and that the fall appeared quite as high.—SMITH's *Wonders.*

THE ROARING CASCADE, JAMAICA.

IN St. Anne's parish Jamaica, is a very remarkable cascade, or, more properly speaking, a cataract, formed by the White river, which is of considerable magnitude, and, after a course of about 12 miles among the mountains, precipitates itself in a fall of about 300 feet or more, obliquely measured, with such a hoarse and thundering noise, as to be heard at a great distance. Viewed from below, the adjutage appears to be a body of water, of small bulk, issuing between a tuft of wood: but, as it continues its descent, the breadth gradually increases, until it reaches the bottom, where it forms a beautiful circular basin, and then flows away in a serpentine course towards the sea. Through the whole descent it is broken and interrupted by a regular climax of steps, of a stalactitic matter, incrusted over a kind of soft chalky stone, which yields easily to the chisel. So vast a discharge of water, thus wildly agitated by the steepness of the fall, dashing and foaming from step to step, with all the impetuosity and rage peculiar to this element, exhibits an awful, pleasing scene. But the grandeur of it is astonishingly heightened by the fresh supplies which it receives after the rainy seasons. At such times, the roaring of the flood, reverberated from the adjacent rocks, trees, and hills; the tumultuous violence of the torrent, tumbling headlong with resistless fury: and the gloom of the overhanging wood, contrasted with the soft serenity of the sky, the silvery glitter of the spray, the flight of birds skimming over the lofty summit of the mountain, and the placid surface of the basin below, form altogether an assemblage of subjects, the most happily mingled, and beyond the power of painting to express.

Wild o'er the brim, with many a torrent swell'd,
And the mix'd ruin of its banks o'erspread,

ROARING CASCADE, JAMAICA.

FALLS OF NIAGARA.

At last the rous'd-up river pours along,
Resistless! roaring! dreadful!—Down it comes
From the rude mountain, and the mossy wild,
Tumbling through rocks abrupt, and sounding far.—
Then o'er the sanded valley floating spreads,
Calm, sluggish, silent;—till again constrain'd
Between two meeting crags, it bursts away,
Where rocks and woods o'er-hang the turbid stream,
There gathering triple force, rapid and deep,
It boils! and wheels! and foams! and thunders through!

THOMSON.

FALLS OF NIAGARA.

ABOUT six leagues from the fort of Niagara, in Canada, is the greatest cataract in the world, known by the name of the *Waterfall of Niagara.* The river at this fall runs from S. S. E. to N. N. W.; and the rock of the fall forms a kind of figure like a hollow semicircle or horse-shoe. Above the fall, in the middle of the river, is an island about 800 feet long; the lower end of which is just at the perpendicular edge of the fall. Before the water comes to this island, it runs but slowly compared with its motion afterwards, when it grows extremely rapid, running with a surprising swiftness before it comes to the fall. It is perfectly white, and in several places is thrown high up into the air. The water that runs down on the west side is in greater abundance and whiter than that on the opposite side; and seems almost to outfly an arrow in swiftness. When a person is at the fall and looks up the river, he may perceive that the water is every where exceedingly steep, almost like the side of a hill; but on looking at the fall itself, it is impossible to describe the astonishment it occasions.

The height of the cataract, as measured by mathematical instruments, is found to be exactly 137 feet; and when the water is come to the bottom it flies back to a great height in the air The noise may sometimes be heard at the distance of 40 miles, but seldom farther. At some

times the fall makes a much greater noise than at others; and this is regarded as an infallible prognostic of rain or other bad weather.

From the place where the water falls there arises a prodigious vapour, like a thick smoke, insomuch that when viewed at a distance, a stranger might suppose that the Indians had set their forests on fire. These vapours rise very high in the air when it is calm, but are dispersed by the wind when it blows hard. If any person go into this vapour, or if the wind blow it on him, it is so penetrating, that in a few moments he will be as wet as if immersed in water.

Some persons are of opinion, that when birds happen to fly into the smoke of the fall, they immediately drop down and perish in the water; either because their wings are become wet, or that the tremenduous roar of the fall astonishes and confounds them; but others think, that this idea is merely chimerical, because among the great numbers of birds found dead below the fall, there are no other sorts than such as live and swim frequently in the water, as swans, geese, ducks, teal, &c. Great flocks of these animals are often seen going to destruction in the following manner: They swim in the river above the fall, and so are carried down lower and lower by the water; and as waterfowl are commonly pleased with being carried by the stream, they indulge themselves in this pleasure, till the rapidity of the water renders it impossible for them to rise, and they are consequently hurried down the precipice.

In the months of September and October, such prodigious quantities of dead water-fowl are found every morning below the fall, that they afford ample subsistence for the garrison at the fort. There also are frequently found the bodies of deer, bears, and other animals, which have attempted to cross the water above the fall. Some melancholy instances of human beings having lost their lives in a similar manner, are related by travellers; and the following one is too affecting to be passed over in silence:—

An unfortunate Indian was reposing, in a state of inebriety, in his canoe, which was properly secured, at the distance of some miles above the cataracts, while his wife sat on the shore to watch his slumbers. After some time, a sailor, from one of the vessels on the lake, happened to

arrive at the spot, and began to take some indecent liberties with the Indian female. The woman naturally attempted to rouse her husband, but before she could effect her design, the brutal mariner cut the cord of the canoe and set it adrift. The little vessel glided swiftly down the stream, and in the space of a few minutes it was seen to enter the Rapids. The Indian, awakened by the violent motion of the waves, started up, and on perceiving his perilous situation, he grasped his paddle with a look of inexpressible horror; but finding it absolutely impossible to stem the force of the current, he calmly wrapped himself up in his blanket, and resumed his former position at the bottom of the canoe. In the space of a few moments, he was hurried down the precipice, and was never discovered more.

There is an island in the middle of the fall, which was formerly supposed inaccessible; but an accident that happened about sixty years ago made it appear otherwise. Two Indians went out from Fort Niagara to hunt upon an island that is situated in the middle of the river, above the great fall, which was then stocked with abundance of deer; but having indulged too freely in the use of some French brandy, they fell asleep, and their canoe drove back with the stream till it approached that island which is in the middle of the fall. They were awakened by the noise of the cataract, and began to give themselves over as lost, but after some vigorous exertions, they effected a landing upon the island. At first they exulted in the idea of their escape; but upon cool reflection they found themselves hardly in a better state than if they had gone down the fall, since they had no other alternative than either to throw themselves down the same or perish with hunger. After some time, however, hard necessity put them on invention; and as they found plenty of wood on the island, they made a ladder of the bark of the lind-tree, in order to reach the water below; one end of this ladder they fastened to a large tree that grew on the side of a rock above the fall, and let the other end down to the water. By this contrivance they descended to the bottom in the middle of the fall · and then threw themselves out into the water, thinking to swim on shore. Scarcely, however, had they begun to swim, before they were thrown

back with violence against the rock from which they came, and after several fruitless attempts, they were compelled to re-ascend to the island. After some time, they discovered Indians on the shore, who appeared to pity their misfortune, but gave them little hope of assistance. These, however, ran to inform the commandant of the fort of the situation of their friends, and he soon projected the means of their deliverance in the following manner:—

The water that runs on the west side of this island is shallow, especially toward the eastern shore. The commandant, therefore, caused some poles to be made and pointed with iron, and by the help of these, two Indians offered to walk to the island to save their unfortunate brethren, or to perish in the attempt. Each had two such poles in his hands to set to the bottom of the stream, in in order to keep him steady, and in this manner they safely reached the island, and brought away the poor creatures, who were almost perishing for want of food.

On the west side of this island are some small rocks; and in former times, a part of the rock at this side of the fall hung over in such a manner, that the water which fell perpendicularly from it left a vacancy below, so that people could go under, between the rock and the water; but, some years ago, the prominent part broke off and fell down. The breadth of the fall, as it runs in a semicircle, is reckoned to be about 300 feet.

Every day when the sun shines, from ten o'clock in the morning till two in the afternoon may be seen, below the fall, the similitude of a beautiful rainbow, and sometimes two, one within another. The brightness and clearness of this phenomenon depends on the quantity of vapour that results from the spray of the cataract: for when the wind drives the vapours away the rainbow disappears; but as soon as new vapours come, it resumes its former appearance. The rock of the fall consists of a grey lime-stone.—SMITH'S *Wonders.*

REMARKABLE LAKES.

ON the top of a ridge of mountains in Portugal, called Estrella, there are two lakes of great extent and depth,

especially one of them, which is said to be unfathomable. What is chiefly remarkable in them is, that they are calm when the sea is so, and rough when that is stormy; which makes it probable that they have a subterraneous communication with the ocean; and this seems to be confirmed by the pieces of ships they occasionally throw up, though almost forty miles distant from the sea. There is another extraordinary lake in this country, which, before a storm, is said to make a frightful rumbling noise, that may be heard at the distance of several miles. And we are also told of a pool or fountain, called Fervanças, about 24 miles from Coimbra, that absorbs not only wood, but even the lightest bodies thrown into it, such as cork, straws, feathers, *&c.*, which sink to the bottom, and are seen no more. To these we may add a remarkable spring near Estremos, which petrifies wood, or rather incrusts it with a case of stone; but the most surprising circumstance is, that it throws up water enough in summer, to turn several mills, whereas in winter it is perfectly dry.—Smith's *Wonders.*

LAKE OF GENEVA.

The Lake of Geneva is always considerably higher in summer than in winter; commonly beginning to increase about the end of January, and continuing to rise till July or August. This circumstance is generally attributed to the melting of the snow and ice from the neighbouring mountains; but it seems highly probable, that there may be a concurrence of other causes. In calm weather, and even before sun-rise, the lake assumes a variety of colours, curiously intermixed, which is supposed to proceed from the reflections of the images on the shore blending together on the bright surface of the water.

Fish are found here in great abundance, and it is observable, that the different species seem to have cantoned themselves, and divided the lake among them; trouts being only found in the current of the Rhone, carp near Vevay, *&c.*, but such fishes as only resort hither occasionally, spread themselves over all parts indifferently. The

trout taken here are extremely large, and the pike have been sometimes known to weigh upwards of eighteen pounds.—SMITH'S *Wonders.*

LAKE OF WAHLESTATT.

THE Lake of Wahlestatt, in the canton of Glaris, in Switzerland, is completely environed with mountains, one of which has an aperture pierced through it near the top, called St. Martin's Hole. Through this hole the sky may be seen on a certain part of the lake, and it is the only inlet of the sun-beams upon a small village called Elm, for four weeks together, about the time of the equinox, every spring and autumn, when the solar rays are transmitted upon this village through St. Martin's Hole, as through a natural telescope.—SMITH'S *Wonders.*

SPRINGS.

NEAR Bourbon-Lanci, in Burgundy, there is a mineral spring, which is said to be so hot, that a man cannot keep his hand in it two minutes, and yet an egg left in it a whole hour will not grow hard. It has neither smell nor taste; nor does it burn the lips when drank, or add any particular warmth to the stomach.

The burning spring, which is reckoned one of the wonders of Dauphiné, is a spot of ground about two yards in length, and one in breadth, on which there appears a small wandering flame, like that of burning brandy. This spot lies on a steep rock of rotten slate; but the flame does not seem to proceed from any fissure in the rock, nor can one perceive any matter proper to feed it, or any ashes produced. There is indeed a kind of white and very sharp salt-petre to be found at some distance from the flame, which probably is fed by something of that nature; but it is remarkable, that this flame burns much brisker in winter than in summer, decreasing gradually as the heat increases, till it sometimes goes quite out, and afterwards kindles again of itself. It may easily be lighted by any other fire, and when this is done it is attended with some

noise. This is probably of the same nature with the ever lasting fire of Persia, of which we shall give a particular account in its proper place.

In the road from Grenoble to Lyons, there is a large cavern or grotto, very wide at the entrance, but growing narrower by degrees, till we come to a lake, which is reckoned another of the wonders of Dauphiné. The French historian Mezray tells us, that Francis I., who loved to inquire into curious and extraordinary phenomena, had a mind to be acquainted with the particulars of this subterraneous lake, and for that purpose ordered a flat-bottomed vessel to be built in the cave that leads to it, which was done accordingly. On each side of this vessel they fastened several boards, on which they placed a great many lighted torches; and having provided matches, steel, flints, and other necessaries, with very able watermen, they put off from the shore with the king. After they had rowed some time, they perceived the breadth of the lake was about half a league; but going nearly two leagues farther, they heard a great noise, which became more frightful as they advanced; and they found the water ran with prodigious swiftness. Imagining from hence that there might be some abyss not far off, they loosened one of the boards with the torches upon it, and set it adrift, which, being carried away with a vast rapidity, was soon overset, or swallowed. Terrified with this, they would venture no further, but returned to the entrance of the grotto.—Smith's *Wonders.*

CANALS, *&c.*

The Duke of Bridgewater's magnificent work, near Manchester, is perhaps the greatest artificial curiosity of its kind in the world. This is a subterranean canal, constructed to convey coals out of a mine, to Manchester and other places, and capable of being applied to many other considerable purposes. It begins at a place called Worsley Mill, about seven miles from Manchester, where, at the foot of a large mountain is a basin that forms a great body of water, which serves as a reservoir, or head, to this navigation; and in order to draw the coals out of the

mine, which runs through the hill to an amazing extent, a subterraneous passage is formed, large enough for long flat-bottomed boats to go up to the mines. This passage also serves to drain the coal-pits of that water which would otherwise obstruct the work, and is carried on under ground to a considerable extent.

Having obtained a ticket to see this curiosity, you enter with lighted candles the subterraneous passage, in a boat made for bringing out the coals. This boat is fifty feet long, four and a half broad, two feet three inches deep, and each end terminates in a point. Through this passage you proceed, towing the boat on each hand by a rail, to the extent of a thousand yards, which is nearly three quarters of a mile, before you come to the coal-works. The passage then divides, one branch continuing in a straight line three hundred yards further, among the coal-works, while another turns off, and proceeds three hundred yards to the left; and each of them may be extended farther, or other passages be opened from them, to any other part, as the mines may run, and necessity require. Hence those who go up both passages, travel nearly three miles under ground before they return. The passages in those parts, where there were coals or loose earth are arched over with brick, and in others the arches are cut out of the rock. At certain distances there are niches on the side of the arch, with funnels or openings through the rock, to the top of the hill, which is in some places thirty-seven yards perpendicular, in order to preserve a free circulation of fresh air, as well as to prevent noxious damps and exhalations, and to let down men to work, in case any accident should happen to the passage. Near the entrance of the passage, and farther on, there are gates to close up the arch, and prevent the admission of too much air, in windy and tempestuous weather.

The arch is at the entrance about six feet wide, and about five feet high, from the surface of the water; but on entering farther it grows wider, so that in some places, boats that are going to and fro, can easily pass each other; and among the pits, the arch is ten feet wide.

Coals are brought from the pits to this passage, in low waggons, that hold nearly a ton each; and as the work is on the descent, they are easily pushed forward, on a rail-

way, to a stage over the canal, and there shot into one of the boats, each of which holds about eight tons. One of these boats thus loaded, is conveyed through the passage by a single man, to the basin at its mouth, where five or six boats being linked together, are drawn by one horse, or two mules, by the side of the canal, to Manchester, or other places.

There are also on the canal a considerable number of broad boats that hold about fifty tons, which are likewise drawn by one horse; besides about fifty of the narrow ones.

It is necessary to take some notice of an overshot mill, near the mouth of the passage, which is so well contrived as to work, by the force of the current, three pair of grinding stones for corn, a dressing or bolting mill, and a machine for sifting sand, and compounding mortar for the buildings. The mortar is made by a large stone, which is placed horizontally, and turned by a cog-wheel underneath it; and this stone, on which the mortar is laid, turns in its course two other stones that are placed upon it obliquely, and by their weight and friction work the mortar underneath, which is tempered and taken off by a man employed for that purpose. The bolting-mill is made of wire, of different degrees of fineness, and at the same time discharges the finest flour, the middling sort, and the coarse flour, as well as the pollard and the bran, without turning round; the work being effected by brushes of hogs' bristles within the wire.

From the basin, of which we have been speaking, the canal takes its course to Manchester, which is nine miles by water, though but seven by land, the other two miles being lost in seeking a level for the water. The canal is broad enough for the barges to pass or go a-breast; and on one side of it there is a good road, for the passage of the people concerned in the work, and for the animals that draw the boats and barges. To perfect this canal, without impeding the public roads, or injuring the people in the country, the duke has in many places built bridges over it, and where the earth was raised to preserve the level, arches under it, all of which are built chiefly of stone, and are both elegant and durable. But what principally strikes the common observer, is a work raised near Barton-bridge,

to convey the canal over the Mersey, a large navigable river, that runs from Manchester to Liverpool. This is done by means of three stone arches, so spacious and lofty as to admit a vessel sailing through them; and it is indeed a noble sight to see large vessels in full sail under this aqueduct, with the duke's vessel sailing at the same time over all, and nearly fifty above the navigable river. At convenient distances there are, by the sides of the canal, receptacles for the superfluous water, and at the bottom of the canal, machines constructed on very simple principles, and placed at proper distances, to stop and preserve the water, in case any part of the bank should happen to break down.

A branch of this celebrated canal runs through part of Cheshire, entering it at the east of Ashton, and leaving it at Runcorn Gap, where it flows into the Mersey. This cut was planned by his Grace, and that justly celebrated engineer Mr. Brindley. Prior to the execution of this canal, the river navigation from Manchester to Liverpool was twelve shillings per ton, but by the canal conveyance it is only six shillings per ton; and independent of this advantage to commerce, a species of boats have been constructed for passengers, by which means a cheap and pleasant intercourse has been opened between Liverpool, Manchester, and several intervening places.—SMITH'S *Wonders*.

LAKE OF THE DEAD SEA.

OF the lakes or seas in Asiatic Turkey, the most remarkable is the Lake Asphaltites, or Dead Sea, which lies in the south part of Judea, and into which the river Jordan discharges itself. This lake is generally supposed to have had its origin from the destruction of Sodom and Gomorrah, the ruins of which cities some travellers pretend to have seen under the water. The formation of it indeed may be tolerably well accounted for, by supposing that the thunder and lightning, which were undoubtedly concerned in the overthrow of those cities, falling in great abundance upon some pits of bitumen, the veins of that combustible matter immediately took fire, which penetrat-

ing into the bowels of the country, and the ground subsiding, an earthquake ensued; and so the waters running to this cavity, and mixing with a vast quantity of bituminous matter, would form a lake of such qualities as it is at present known to possess. This lake seems to have obtained the name of the Dead Sea, from a notion that its steam or stench killed all birds that attempted to fly over it, and that no fish or other creature could live in it. But as to the former, there is sufficient evidence of its being a mistake, birds being frequently seen flying across it without receiving any injury; and as to the latter, there is good reason to doubt the truth of it, some shells, like those of oysters, having been found upon the shore. The water, however, is extremely salt, bitter, and nauseous; which might probably have given rise to such a tradition.—SMITH'S *Wonders*.

THE DEVIL'S COPPERS.

IN the island of St. Christopher, in the West Indies, are some boiling springs, vulgarly called the "Devil's Coppers," each of them about three feet in diameter. The water is of a muddy colour, and rises within twelve inches of the surface of the earth, boiling fiercer than a sugar copper, and sending up strong clouds of steam into the air. No kind of grass will grow within twelve yards of these springs, the soil being wholly sulphurous, and so excessively hot, that the travellers found it warm through very thick shoes which they had bought on purpose for this expedition. A negro in company was much frightened at the sight of these coppers, and could not be dissuaded from believing that Jumbu, or the devil had his residence underneath them.—SMITH'S *Wonders*.

PYRAMIDS AND PILLARS.

POMPEY'S PILLAR.

The pillar of Pompey, as it is generally called, is situated about a quarter of a league from the southern gate at Alexandria in Egypt. It is composed of red granite. The capital is Corinthian, ornamented with palm-leaves, and not indented. The shaft and the upper member of the base are of one piece, 90 feet long, and 9 in diameter. The base, which is a square block of marble, 60 feet in circumference, rests on two layers of stone, bound together with lead. The whole column is 114 feet high, perfectly well polished, and only a little shivered on the eastern side.

Nothing can equal the majesty of this monument; seen from a distance, it overtops the town, and serves as a signal for vessels; and on a nearer approach, it produces an astonishment mingled with awe. One can never be tired with admiring the beauty of the capital, the length of the shaft, and the extraordinary simplicity of the pedestal; although the latter has been rather damaged by the instruments of travellers, who were anxious to possess a relic of this antiquity: and one of the volutes of the column was immaturely brought down, in the year 1781, by a prank of some English captains, which is thus related by Mr. Irwin:

These jolly tars of Neptune had been pushing about the can on board one of the ships in the harbour, until a strange freak entered into one of their brains. The eccentricity of the thought occasioned it immediately to be adopted, and its apparent impossibility was but a spur for the putting it into execution. The boat was ordered, and with proper implements for the attempt these enterprising heroes pushed ashore, to drink a bowl of bunch on the top of Pompey's pillar! At the spot they arrived, and many contrivances were proposed to accomplish the desired point. But their labour was vain, and they began to despair of success when the genius who

struck out the frolic happily suggested the means of performing it. A man was despatched to the city for a paper kite. The inhabitants were by this time apprized of what was going forward, and flocked in crowds to be witnesses of the address and boldness of the English. The governor of Alexandria was told that these seamen were about to pull down Pompey's pillar. But whether he gave them credit for their respect to the Roman warrior, or to the Turkish government, he left them to themselves, and politely answered—That the English were too great patriots to injure the remains of Pompey. He knew little, however, of the disposition of the people who were engaged in this undertaking; for had the Turkish empire rose in opposition, it would not perhaps at that moment have deterred them. The kite was brought, and flown so directly over the pillar, that, when it fell on the other side, the string lodged upon the capital. The chief obstacle was now overcome. A two-inch rope was tied to one end of the string, and drawn over the pillar by the end to which the kite was affixed. By this rope one of the seamen ascended to the top; and, in less than an hour, a kind of shrowd was constructed, by which the whole company went up and drank their punch, amid the shouts of the astonished multitude. To the eye below, the capital of the pillar does not appear capable of holding more than one man upon it; but our seamen found it could contain no less than eight persons very conveniently. It is astonishing that no accident befel these madcaps, in a situation so elevated that would have turned a landman giddy in his sober senses. The only detriment which the pillar received was the loss of the volute before mentioned, which came down with a thundering sound, and was carried to England by one of the captains, as a present to a lady who commissioned him for a piece of the pillar. The discovery which they made amply compensated for this mischief, as, without their evidence, the world would not have known at this hour, that there was originally a statue on this pillar, one foot and an ancle of which are still remaining. The statue must have been of a gigantic size, to have appeared of a man's proportion at so great a height.

There are circumstances in this story which might give

it an air of fiction, were it not demonstrated beyond all doubt. Besides the testimonies of many eye-witnesses, the adventurers themselves have left a token of the fact by the initials of their names, which are very legible in black paint just beneath the capital.

Learned men and travellers have made many fruitless attempts to discover in honour of what prince this stately pillar was erected: for, notwithstanding its common appellation, it could not have been raised to the memory of Pompey, as neither Strabo nor Diodorus Siculus have spoken of it. Abulfeda, in his *Description of Egypt*, calls it the Pillar of Severus; and history informs us, that this emperor visited the city of Alexandria; that he granted a senate to its inhabitants, who, until that time, under the subjection of a single Roman magistrate, had lived without any national council; and that he changed several laws in their favour. This column, therefore, M. Savary concludes to have been erected by the inhabitants as a mark of their gratitude to Severus. And in a Greek inscription, now half effaced, but visible on the west side when the sun shines upon it, he supposes the name of Severus to have been preserved. He further observes, that this was not the only monument erected to that emperor by the gratitude of the Alexandrians; for there is still in the midst of the ruins of Antinoe a magnificent pillar, the inscription on which is still remaining, and proves that it was dedicated to Alexander Severus. It has, however, been lately asserted that the above-mentioned inscription on what is vulgarly called Pompey's pillar has been deciphered, and proves that the column was erected in honour of Diocletian by the then prefect of Egypt.

COLOSSAL STATUE OF PETER THE GREAT.

One of the noblest monuments of veneration for Peter the Great, is an equestrian statue of that monarch, cast in bronze by M. Falconet, at the expense of the late empress, and erected in the area before the palace at Petersburgh. The pedestal, on which it stands, is a stupendous mass of reddish granite, which was discovered, half buried in a

morass, at some distance from the city. The morass was drained, and a road cut through a forest, in order to get it out; and, although it weighed 1,500 tons, even after it was reduced, it was drawn by a windlass and large friction balls, placed in grooves on each side of the road, to the banks of the Neva. It was then embarked in a vessel, which had been purposely constructed for its reception, and conveyed to the place where it now stands.

When landed at Petersburgh, this pedestal was 42 feet long at the base, 36 at the top, 21 in thickness, and 17 in height; a bulk, greatly surpassing in weight the most boasted monuments of Roman grandeur. Here, however, we must observe, that this truly curious rock does not now retain its original dimensions; as, in forming a proper station for the statue, and representing an abrupt broken precipice, its bulk has been necessarily diminished.

The statue is of colossal size, and represents the monarch in the act of mounting a precipice, the summit of which he has nearly attained. He appears in a loose Asiatic vest, seated on a bear-skin housing, and crowned with a wreath of laurel; his left hand holds the reins, and his right is extended, as in the act of blessing his people. The horse is rearing on his hind legs, and his flowing tail slightly touches a bronze serpent, artfully contrived to assist in supporting the ponderous statue in due equilibrium. The simplicity of the inscription,

CATHERINE II. TO PETER I.

is perfectly correspondent with the sublimity of the design, and, as a celebrated traveller has observed, it is far preferable to a pompous detail of exalted virtues, which the voice of flattery applies to every sovereign without distinction.

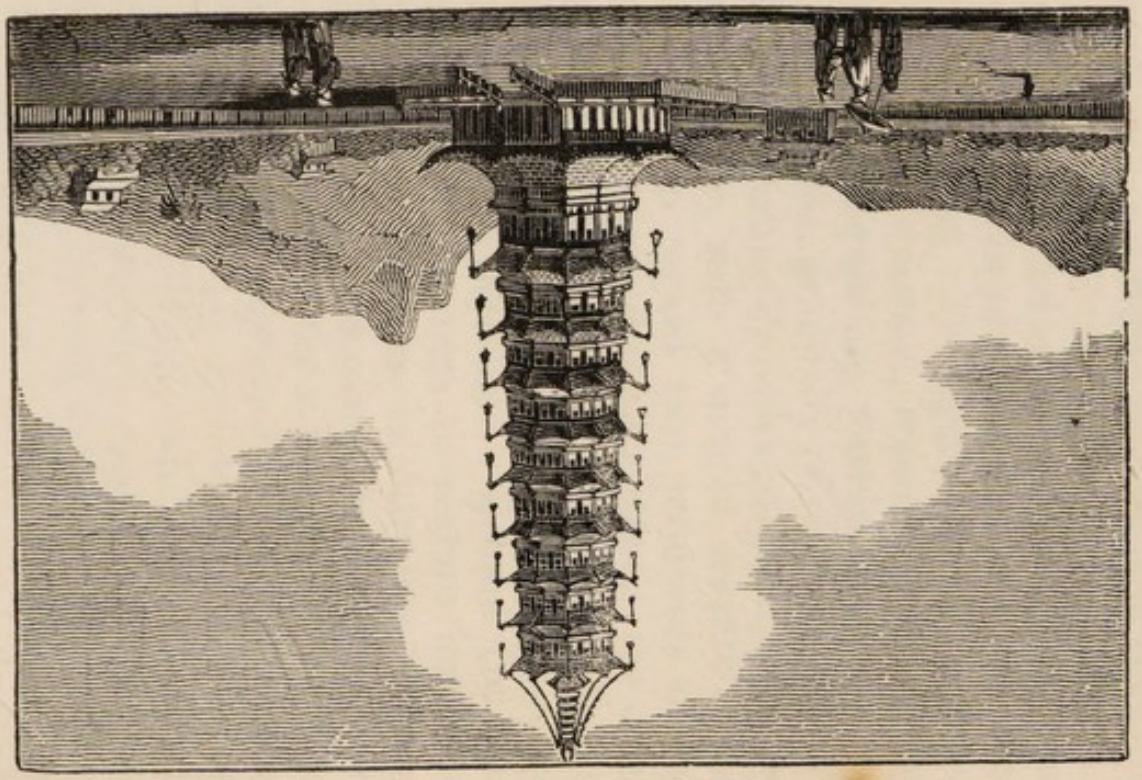
This beautiful statue was erected on its pedestal in the year 1782, and the ceremony was performed with equal pomp and solemnity. At the same time an imperial proclamation was issued, to pardon all criminals under sentence of death; all convicts, excepting murderers, condemned to hard labour; and all deserters who should return to their duty within a limited time.

PORCELAIN TOWER, NANKIN, CHINA.

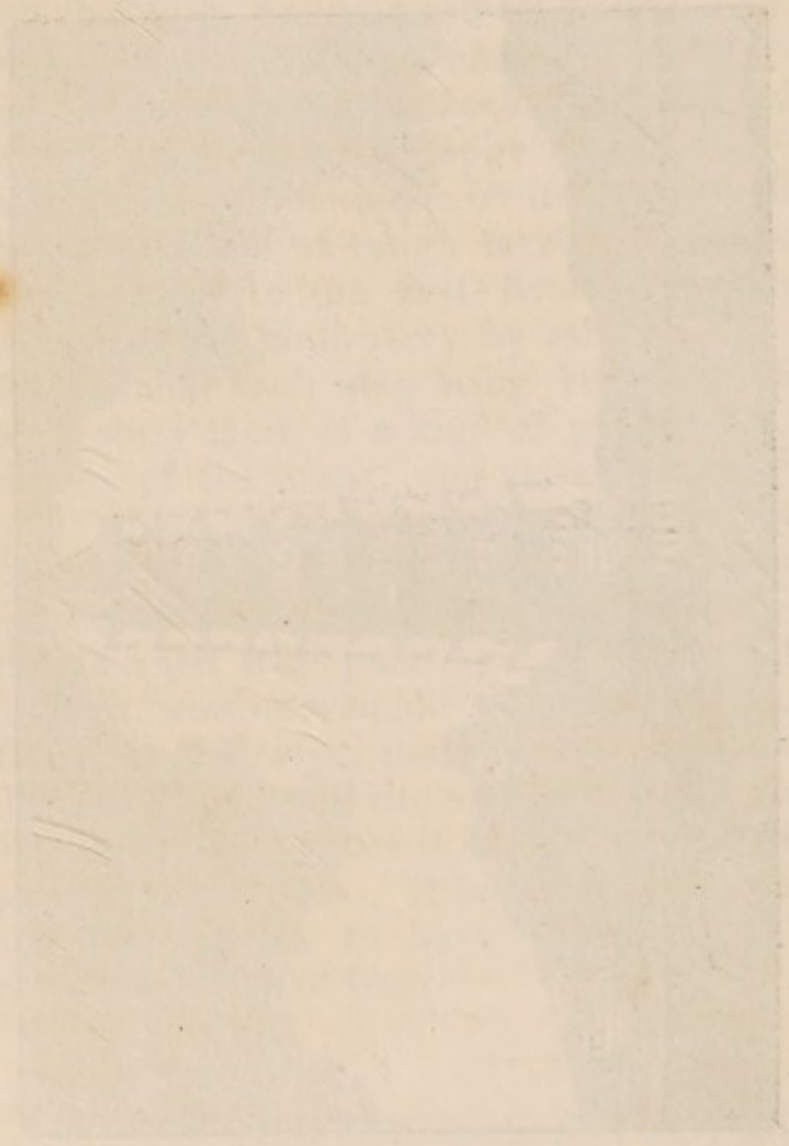
WITHOUT the gates of several great cities in China there are lofty towers erected, which seem chiefly designed for ornament, and for taking a view of the adjacent country. The most remarkable of these towers is that of Nankin, called the porcelain tower, from its being entirely covered with porcelain tiles, beautifully painted. It is of an octangular figure, contains nine stories, and is about 200 feet high, being raised on a very solid base of brick-work. The wall at the bottom is at least 12 feet thick; and the building gradually diminishes to the top, which is terminated by a sort of spire or pyramid, having a large golden ball or pine-apple on its summit. It is surrounded by a balustrade of rough marble, and has an ascent of twelve steps to the first floor, from whence one may ascend to the ninth story by very narrow and incommodious stairs, each step being 10 inches deep. Between every story there is a kind of pent-house or shed on the outside of the tower, and at each corner are hung little bells, which, being agitated by the wind, make a pleasant jingling. Each story is formed by large pieces of timber, and boards laid across them. The cielings of the rooms are adorned with paintings; and the light is admitted through windows made of grates or lattices of wire. There are, likewise, many niches in the wall, filled with Chinese idols; and the variety of ornaments that embellish the whole, render it one of the most beautiful structures in the empire. It has now stood above 350 years, and yet appears to have suffered bnt little from the corroding tooth of time.

THE MONUMENT, LONDON.

UPON Fish-street-hill, on the north side of London-Bridge, stands a beautiful and magnificent column of the Doric order, built with Portland stone, called the Monument. This column, which was erected to perpetuate the memory of the fire of London, which broke out near the place where it stands, was begun, according to a design of Sir Christopher Wren, in 1671, and finished in 1676. It is 15



PORCELAIN TOWER.



feet in diameter, and 202 feet high from the ground; it stands upon a pedestal, 40 feet high, and 21 feet square. On the cap of the pedestal are four dragons, the supporters of the city arms; and between them trophies, with symbols of regality, arts, sciences, and commerce.

Within it is a spiral stair-case of black marble, containing 345 steps, with iron rails, leading to a balcony, which encompasses a cone 32 feet high, and supporting a blazing urn of brass gilt. It is observed of this column, that, like the emperor Trajan's pillar at Rome, it is built in the form of a candle.

The west side of the pedestal is adorned with emblems by Cibber, of which the eleven principal figures are in alto, and the rest in basso-relievo. The figure to which the eye is particularly directed is a female, representing the city of London, sitting in a languishing posture on a heap of ruins. Behind her is Time, gradually raising her up. At her side a woman, representing Providence, gently touches her with one hand, while, with a winged sceptre in the other, she directs her to regard two goddesses in the clouds, one with a cornucopia, denoting plenty, the other with a palm branch, the emblem of peace. At her feet is a bee-hive, importing that by industry and application the greatest misfortunes may be overcome. Behind Time are citizens, exulting at his endeavours to restore her; and beneath, in the middle of the ruins, is a dragon, the supporter of the city arms, who endeavours to preserve them with his paw. Still further, at the north end, is a view of the city in flames, with the consternation of the inhabitants. On the other side, on an elevated pavement, stands King Charles II. in a Roman habit, who, approaching the figure representing the city, appears to command three of his attendants to descend to her relief; the first represents the Sciences, the second Architecture, and the third Liberty. Behind the king stands his brother, the Duke of York, with a garland in one hand to crown the rising city, and a sword in the other for her defence. Behind him are Justice and Fortitude. In the pavement, under the sovereign's feet, appears Envy, peeping from her cell and gnawing a heart; and, in the upper part of the back ground, the re-construction of the city is represented by scaffolds, erected by the sides of un-

finished houses, with builders and labourers at work upon them.

The other sides of the pedestal have each a Latin inscription: that on the north side is an account of the rise, progress, and amazing devastation of the fire of London; the inscription on the south side, specifies the prudent and vigorous measures taken by the king and parliament for restoring the city, with great beauty, magnificence, and convenience, and for preventing similar misfortunes for the future; the inscription on the east side contains the names of the lord mayors from the time it was begun till it was finished; and round the upper part of the pedestal is the following inscription in English:—

"This pillar was set up in perpetual remembrance of the most dreadful burning of this protestant city, begun and carried on by the treachery and malice of the popish faction, in the beginning of September, in the year of our Lord 1666, in order to their carrying on their horrid plot, for extirpating the protestant religion, and old English liberty, and introducing popery and heresy."

This inscription, upon the duke of York's accession to the crown, was erased; but soon after the revolution, it was restored again.

It has been observed of this monument, that it is undoubtedly the noblest modern column in the world: and that, in some respects, it may vie with those celebrated ones of antiquity which are consecrated to the names of Trajan and Antoninus.—Smith's *Wonders*.

THE PYRAMIDS OF EGYPT, AND SPHYNX.

These stupenduous buildings stand between the city of Memphis (now Cairo) and Delta. It is related by Pliny and others, that the largest pyramid employed continually 360,000 men, for twenty years; that 1800 talents, or 180,000 crowns, were paid for roots, garlic, and onions, to sustain the multitude of workmen. The whole area at the base contains 482,249 square feet, which is somewhat more than eleven acres of ground. On the outside of the pyramid there is an ascent by steps, which, at the bottom,

PYRAMIDS AND SPHYNX.

are four feet in height, and three in breadth, but the higher they go they gradually diminish; being so contrived, that a straight line, stretched from any part of the basis to the top, would touch the edge of every step. The breadth and depth of every step is one entire stone, several of them 30 feet in length, and the number of steps is 207.

It has been observed of this pyramid, that its sides stand exactly facing east, west, north, and south, and, consequently, mark the true meridian of the place; which precise position could not well have been owing to chance, but was, in all probability, the effect of art and design; and that it really was so, seems confirmed by the position of the tomb within, so that this ancient structure may be considered as a strong and lasting proof of the early progress of the Egyptians in the science of astronomy. Within the stately hall of this pyramid stands a tomb placed directly north and south. It consists of one piece of marble, hollowed, without any lid or covering, and, on being struck, it sounds like a bell. The general opinion is, that it was designed for the tomb of Cheops, or Chommis, king of Egypt, the supposed founder of the pyramid. The following description of a visit to this extraordinary place, by Dr. Clarke, is particularly interesting.

On Wednesday, the 12th of August, (says Dr. Clarke), we were roused, as soon as the sun dawned, by Antony, our faithful Greek servant and interpreter, with the intelligence, that the Pyramids were in view. We hastened from the cabin; and never will the impression made by their appearance be obliterated. By reflecting the sun's rays, they appeared as white as snow, and of such surprising magnitude, that nothing we had previously conceived in our imagination had prepared us for the spectacle we beheld. The sight instantly convinced us, that no power of description, no delineation, can convey ideas adequate to the effect produced in viewing these stupendous monuments. The formality of their structure is lost in their prodigious magnitude: the mind, elevated by wonder, feels at once the force of an axiom, which, however disputed, experience confirms,—that in vastness, whatsoever be its nature, there dwells sublimity!

Upon the 23rd of August, we set out for the Pyramids,

the inundation enabling us to approach within less than mile of the larger pyramid, in our *djerm*. Messrs. Hammer and Hamilton accompanied us. We arrived at Djiza by day-break, and called upon some English officers who wished to join our party upon this occasion. From Djiza, our approach to the Pyramids was through a swampy country, by means of a narrow canal, which however was deep enough; and we arrived without any obstacle, at nine o'clock, at the bottom of a sandy slope, leading up to the principal pyramid. Some Bedouin Arabs, who had assembled to receive us upon our landing, were much amused by the eagerness excited in our whole party, to prove who should first set his foot upon the summit of this artificial mountain. As we drew near its base, the effect of its prodigious magnitude, and the amazement caused in viewing the enormous masses used in its construction, affected every one of us; but it was an impression of awe and fear, rather than of pleasure. In the observations of travellers who had recently preceded us, we had heard the Pyramids described as huge objects which gave no satisfaction to the spectator, on account of their barbarous shape, and formal appearance: yet to us it appeared hardly possible, that persons susceptible of any feeling of sublimity could behold them unmoved. With what amazement did we survey the vast surface that was presented to us, when we arrived at this stupendous monument, which seemed to reach the clouds! Here and there appeared some Arab guides upon the immense masses above us, like so many pigmies, waiting to shew the way up to the summit. Now and then we thought we heard voices, and listened; but it was the wind, in powerful gusts, sweeping the immense ranges of stone.

Already some of our party had begun the ascent, and were pausing at the tremendous depth which they saw below. One of our military companions, after having surmounted the most difficult part of the undertaking, became giddy, in consequence of looking down from the elevation he had attained: and being compelled to abandon the project, he hired an Arab to assist him in effecting his descent. The rest of us, more accustomed to the business of climbing heights, with many a halt for respiration, and many an exclamation of wonder, pursued our

way towards the summit. The mode of ascent has been frequently described; and yet, from the questions which are often proposed to travellers, it does not appear to be generally understood. The reader may imagine himself to be upon a staircase, every step of which, to a man of middle stature, is nearly breast high; and the breadth of each step is equal to its height: consequently, the footing is secure; and although a retrospect, in going up, be sometimes fearful to persons unaccustomed to look down from any considerable elevation, yet there is little danger of falling. In some places, indeed, where the stones are decayed, caution may be required; and an Arab guide is always necessary, to avoid a total interruption: but, upon the whole, the means of ascent are such, that almost every one may accomplish it. Our progress was impeded by other causes. We carried with us a few instruments, such as our boat-compass, a thermometer, a telescope, *&c.*; these could not be trusted in the hands of the Arabs, and they were liable to be broken every instant. At length we reached the topmost tier, to the great delight and satisfaction of all the party. Here we found a platform, 32 feet square, consisting of nine large stones, each of which might weigh about a ton; although they be much inferior in size to some of the stones used in the construction of this pyramid. Travellers, of all ages, and of various nations, have here inscribed their names. Some are written in Greek, many in French, a few in Arabic, one or two in English, and others in Latin. We were as desirous as our predecessors to leave a memorial of our arrival; it seemed to be a tribute of thankfulness, due for the success of our undertaking; and presently every one of our party was seen busied in adding the inscription of his name.

The view from this eminence amply fulfilled our expectations; nor do the accounts which have been given of it, as it appears at this season of the year, exaggerate the novelty and grandeur of the sight. All the region towards Cairo and the Delta resembled a sea, covered with innumerable islands. Forests of palm-trees were seen standing in the water; the inundation spreading over the land where they stood, so as to give them an appearance of growing in the flood. To the north, as far as the eye could reach, nothing could be discerned, but a watery

surface thus diversified by plantations and by villages To the south we saw the Pyramids of Saccara; and, upon the east of these, smaller monuments of the same kind, nearer to the Nile. An appearance of ruins might indeed be traced the whole way from the Pyramids of Djiza to those of Saccara; as if they had been once connected, so as to constitute one vast cemetery. Beyond the Pyramids of Saccara we could perceive the distant mountains of the Said; and upon an eminence on the Lybian side of the Nile appeared a monastery of considerable size. Towards the west and south-west, the eye ranged over the great Lybian Desert, extending to the utmost verge of the horizon, without a single object to interrupt the dreary horror of the landscape, except dark floating spots, caused by the shadows of passing clouds upon the sand.

Having collected our party upon a sort of platform before the entrance of the passage leading to the interior, and lighted a number of tapers, we all descended into its dark mouth. The impression made upon every one of us, in viewing the entrance, was this: that no set of men whatever could thus have opened a passage, by uncovering precisely the part of the pyramid where the entrance was concealed, unless they had been previously acquainted with its situation; and for these reasons: First, because its position is almost in the centre of one of its planes, instead of being at the base. Secondly, that not a trace appears of those dilapidations which must have been the result of any search for a passage to the interior; such as now distinguish the labours of the French upon the smaller pyramid, which they attempted to open. The persons who undertook the work actually opened the pyramid in the only point, over all its vast surface, where, from the appearance of the stones inclined to each other above the mouth of the passage, any admission to the interior seems to have been originally intended. So marvellously concealed as this was, are we to credit the legendary story given to us from an Arabian writer, who, discoursing of the Wonders of Egypt, attributed the opening of this pyramid to Almamon, a Caliph of Babylon, about 950 years since.

Proceeding down this passage, (which may be compared to a chimney about a yard wide, inclined, as Greaves

affirms, by an angle of twenty-six degrees to the platform at the entrance,) we presently arrived at a very large mass of granite; this seems placed on purpose to choke up the passage; but a way has been made round it, by which we were enabled to ascend into a second channel, sloping, in a contrary direction, towards the mouth of the first. This is what Greaves calls the *first gallery;* and his description is so exceedingly minute, both as to the admeasurements and other circumstances belonging to these channels, that it were a useless waste of the reader's time to repeat them here. Having ascended along this channel, to the distance of 110 feet, we came to a horizontal passage, leading to a chamber with an angular roof, in the interior of the pyramid. In this passage we found, upon our right hand, the mysterious well, which has been so often mentioned. Pliny makes the depth of it equal to 129 feet; but Greaves, in sounding it with a line, found the plummet rest at the depth of 20 feet.

We threw down some stones, and observed that they rested at about the depth which Greaves has mentioned; but being at length provided with a stone nearly as large as the mouth of the well, and about fifty pounds in weight, we let this fall, listening attentively to the result from the spot where the other stones rested; we were agreeably surprised by hearing, after a length of time which must have equalled some seconds, a loud and distinct report, seeming to come from a spacious subterraneous apartment, accompanied by a splashing noise, as if the stone had been broken into pieces, and had fallen into a reservoir of water at an amazing depth. Thus does experience always tend to confirm the accounts left us by the ancients, for this exactly answers to the description given by Pliny of this well.

After once more regaining the passage whence these ducts diverge, we examined the chamber at the end of it, mentioned by all who have described the interior of this building. Its roof is angular; that is to say, it is formed by the inclination of large masses of stone leaning towards each other, like the appearance presented by those masses which are above the entrance of the pyramid. Then quitting the passage altogether, we climbed the slippery and difficult ascent which leads to what is called the principal

chamber. The workmanship, from its perfection, and its immense proportions, is truly astonishing. All about the spectator, as he proceeds, is full of majesty, mystery and wonder. Presently we entered that "glorious room," as it is justly called by Greaves, where, "as within some consecrated oratory, Art may seem to have contended with Nature." It stands "in the very heart and centre of the pyramid, equidistant from all its sides, almost in the midst between the basis and the top. The floor, the sides, the roof of it, are all made of vast and exquisite tables of Thebaick marble." It is often called Oriental granite, and sometimes Egyptian granite; but it differs in no respect from European granite, except that the red feldspar enters more largely as a constituent into the mass than is usual in the granite of Europe. So exquisitely are the masses of this granite fitted to each other upon the sides of this chamber, that, having no cement between them, it is really impossible to force the blade of a knife within the joints. This has been often related before; but we actually tried the experiment, and found it to be true. There are only six ranges of stone from the floor to the roof, which is 20 feet high; and the length of the chamber is about 12 yards. It is also about six yards wide. The roof or ceiling consists only of nine pieces, of stupendous size and length, traversing the room from side to side, and lying, like enormous beams, across the top.

It is impossible to leave the Pyramids of Djiza without some notice of the long list of philosophers, marshals, emperors, and princes, who, in so many ages, have been brought to view the most wonderful of the works of man. There has not been a conqueror pre-eminently distinguished in the history of the world, from the days of Cambyses down to the invasion of Napoleon Buonaparte, who withheld the tribute of his admiration from the genius of the place. The vanity of Alexander the Great was so piqued by the overwhelming impression of their majesty, that nothing less than being ranked among the gods of Egypt could elevate him sufficiently above the pride of the monarchs by whom they were erected. When Germanicus had subdued the Egyptian empire, and seated "a Roman præfect upon the splendid throne of the Ptolemies," being unmindful of repose or of triumph, the antiquities of

the country engaged all his attention. The humblest pilgrim, pacing the Libyan sands around them, while he is conscious that he walks in the footsteps of so many mighty and renowned men, imagines himself to be for an instant admitted into their illustrious conclave. Persian satraps, Macedonian heroes, Grecian bards, sages, and historians, Roman warriors, all of every age, nation, and religion, have participated, in common with him, the same feelings, and have trodden the same ground. Every spot that he beholds, every stone on which he rests his weary limbs, have witnessed the coming of men who were the fathers of law, of literature, and of the arts. Orpheus, Musæus, Homer, Lycurgus, Solon, Pythagoras, Plato, Plutarch, contributed by their presence to the dignity of the place. Desolate and melancholy as the scene appears, no traveller leaves it without regret, and many a retrospect of objects which call to his mind such numerous examples of wisdom, of bravery, and of virtue.

Four miles to the south of Saccara stands a pyramid built of unburnt bricks. This is in a very mouldering state. The bricks contain shells, gravel, and chopped straw; they are of the same nature as the unburned bricks in modern use in Egypt. Pococke concluded, from its present appearance, that this pyramid was built with five gradations only. It is of the same height as the other graduated pyramid of six degrees.

As we left Bulac we had one of the finest prospects in the world, presented by the wide surface of the Nile crowded with vessels, the whole city of Cairo, the busy throng of shipping at the quay, the citadel and heights of Mokatam, the distant Said, the Pyramids of Djiza and Saccara, the Obelisk of Heliopolis, and the Tombs of the Sultans; all these were in view at the same time; the greater objects being tinged with the most brilliant effect of light it is possible to conceive; while the noise of the waters, the shouts of the boatmen, and the moving picture every where offered by the Nile, gave a cheerful contrast to the stillness of the desert, and the steadfast majesty of monuments, beautifully described by a classic bard as "looking tranquillity."

THE SPHYNX.

This celebrated monument of Egyptian antiquity is still to be seen about sixty yards to the right of the great pyramid, from the eastern point, and opposite Cairo. This enormous figure, carved out of one stone, was considerably diminished in its bulk by the accumulation of sand, till the industry of the French had lately uncovered more of this figure than had been seen for centuries past. The most of its features have been mutilated by different barbarians from time to time; its face, perfectly Nubian, still preserves a considerable degree of feminine beauty. It has no breasts, neither are the feet visible; and, as the rock seems to have been cut for the particular purpose of exhibiting the back of a lion, this representation is said to intimate, that when the sun passes from Leo into Virgo, the increase of the Nile is sure to follow. The height of the Sphynx is 26 feet, the circumference of the head twelve, while the length of the back is supposed to be nearly 60 feet. But relative to the supposition of a subterraneous passage from thence to the pyramids, it is proved to be totally unfounded.

COLUMNS AT ROME.

TRAJAN'S PILLAR.

There are four columns in Rome that are remarkable for their antiquity and excellent workmanship, particularly that erected in honour of the emperor Trajan, which is about 130 feet high, exclusive of the pedestal. It consists of large pieces of white marble, hollow within, and so curiously cemented, as to seem but one entire stone. Within it there is a spiral staircase up to the top, to which the light is admitted by many little windows; and the outside is adorned with fine bas-reliefs, representing the great actions of the emperor. Instead of a golden urn at the top of it, in which his ashes were deposited there is now a statue of St. Peter.—Smith s *Wonders.*

ANTONINUS'S PILLAR.

The column of Antoninus Pius is higher than that of Trajan, but inferior to it in the beauty of the workmanship. The emperor's statue was formerly placed on the summit, but this has been succeeded by one of St. Paul. The ornaments on the outside are of the same nature as those on the Trajan column; and, amongst other historical pieces, there is a figure of Jupiter Pluvius sending down rain on Antoninus's fainting army, and thunderbolts on his enemies; which seems to be a great confirmation of the following anecdote:

In one of Antoninus's expeditions, when his army was surrounded by the enemy, and ready to perish for want of water, a legion, consisting of Christian soldiers, obtained by their prayers a plentiful shower of rain, and, at the same time, a terrible storm of thunder and lightning, which destroyed great numbers of the enemy's army, and made way for a complete victory.

Mr. Addison has given a translation of a beautiful passage in Claudian, describing the effects of this tempest.

When, with descending show'rs of brimstone fir'd,
The wild barbarian in the storm expir'd.
Wrapt in devouring flames the horseman rag'd,
And spurr'd the steed in equal flames engag'd.
Another pent in his scorch'd armour glow'd,
While from his head the melting helmet flow'd:
Swords by the lightning's subtil force distill'd,
And the cold sheath with running metal fill'd.
No human arm its weak assistance brought,
But Heav'n, offended Heav'n, the battle fought.

COLUMNA ROSTRATA.

The columna rostrata is a curious piece of antiquity, having been erected to the honour of Caius Duilius, for a signal victory gained over the Carthaginian and Sicilian fleets, above 250 years before the birth of our Saviour. It was adorned with the beaks of the vessels taken in the

engagement, and has an inscription on its base, but grea part of it is now illegible. The milliary column, whence the Romans reckoned their miles to all parts of Italy, is still to be seen at Rome. It is of white marble, about eight feet high, and formerly stood in the Forum Romanum, but is now removed to the capitol.—SMITH's *Wonders.*

OF the great number of obelisks that were in ancient Rome, the most beautiful now remaining stands in the piazza before St. Peter's church, whither it was brought from the Circus of Nero, after it had lain buried in ruins for many ages. It is one entire piece of Egyptian marble, 72 feet high, 12 feet square at the base, and 8 at the top; and is computed to weigh above 470 tons, and supposed to be upwards of 3,000 years old. Notwithstanding its immense weight, it was erected on a pedestal, 30 feet high, by the celebrated architect Dominico Fontanæ, in the pontificate of Sixtus V., with vast expense and labour, and to the astonishment of all the spectators.—SMITH's *Wonders.*

ROYAL PALACES, *&c.*

THE ESCURIAL.

THIS palace is so called from a little village of that name, in the neighbourhood of which it stands, about 22 miles from Madrid. Including the monastery, church, college, library, and other buildings, it is the most magnificent in the kingdom, and is reckoned by the Spaniards the eighth wonder of the world. The whole pile of building is a vast square, about 3,000 feet in circumference, all of fine grey stone, dug out of a neighbouring mountain, and so well polished that it looks like marble. The windows of the four fronts, including those in the pavilions at each corner, amount to

upwards of 1,100; but those within are computed at as many thousands. The principal front faces the west, having three noble gates, especially that in the middle, which leads to the church, a large and beautiful structure, built in imitation of St. Peter's at Rome. It is 364 feet long, 230 broad, and of a proportionable height. The roof, which is finely gilt and painted, is supported by columns of the Doric order, dividing it into six stately aisles, with 48 chapels and altars, besides the grand one at the east end, which is extremely magnificent. The tabernacle of the great altar is of porphyry, wrought with the point of a diamond; it is made in the form of a cupola, supported by eighteen columns of agate, and adorned with gold and precious stones. The altar itself is of fine black marble; and the wall behind it is lined with a square piece of porphyry, which reflects all the objects in the church as plain as a looking-glass. Here are a great number of statues of saints, &c., of excellent workmanship, and several of the smaller sort of gold and silver. The paintings, which are said to amount to 1,600, are large, and executed by the most eminent masters. Under the grand chapel is a large mausoleum or burying-place for the royal family, which is called the Pantheon, being a rotunda, built after the manner of that temple at Rome. The descent consists of more than fifty marble steps, and the gate that opens into it is of brass gilt, and of very curious workmanship. The dome is lined with jasper, intermixed with small plates of brass, and the pavement is likewise composed of squares of jasper and marble. Facing the entrance is a kind of chapel, or oratory, adorned in the most sumptuous manner imaginable, particularly with a crucifix enriched with diamonds and other precious stones. In the middle of this noble vault is a large brazen candlestick, supported by figures of angels, and the four Evangelists, of the same metal; and in 26 niches, embellished with the richest ornaments, are placed as many urns or sepulchres of black marble, destined to receive the remains of the Spanish monarchs. The royal apartments, or what may be properly called the palace, are large and stately, furnished in the most magnificent manner, and adorned with every thing that is rich and beautiful. Throughout the whole, an attentive spectator

must observe a variety of marble, jasper, and other curious stones, carved by the best masters, and in the grandest taste; and all the halls, galleries, stair-cases, &c., are filled with excellent paintings, together with a profusion of fine hangings, plate, and other costly furniture. The monastery consists of five courts, or squares, one larger than the rest, each of them adorned with a marble fountain. The grand cloister, which is 210 feet square, is paved with black and white marble, as are likewise the walks of the garden within it; and at the bottom of it is a beautiful chapel, in form of a dome, open on all sides, and supported by marble columns. The refectory, or hall, where the monks take their meals, is very long, and adorned with fine paintings, amongst which there is one representing Charles V. and Philip II. carried to heaven by angels. Here are also several infirmaries for the sick, two grand apartments to entertain strangers, nine kitchens, forty subterraneous rooms for offices of divers kinds, and eleven cisterns that will hold 200 tons of water. The college, where a number of young students are maintained at the king's expense, is a very handsome building; and the noble library is perfectly correspondent with the rest of this edifice. It contains a fine collection of books and manuscripts in all languages and sciences, disposed in a very elegant manner, the shelves being neatly carved, and made of the choicest sorts of Spanish or Indian wood. The floor is beautifully paved with marble; and the ceiling is adorned with appropriate paintings. But to give an adequate idea of the surprising grandeur of this palace, it is proper to observe, that, according to the computation of Francisco de los Santos, it would take up more than four days to go through all its rooms and apartments, the length of the way being reckoned 33 Spanish leagues, which is above 120 English miles. Alvarez de Colmenar also asserts, that there are 14,000 doors and 11,000 windows belonging to this edifice.

THE STADTHOUSE, AMSTERDAM.

The Stadthouse of Amsterdam is not only the most magnificent in the United Provinces, but is generally

thought to surpass any thing of the kind in Europe. This superb edifice is all freestone, built upon 13,659 piles*, driven into the ground close to each other; and the first stone was laid on the 28th of October, 1648. It is a square building, 282 feet in length, 235 in depth, 90 feet high in front, and 160 to the top of the cupola. It has above 400 windows, and is adorned with a great number of pilasters of the Corinthian order. On the pediment in the centre of the front is an admirable piece of sculpture in relievo, representing the city of Amsterdam under the figure of a woman sitting in a chair, supported by two lions, and holding on her knee the arms of the city. In her hand she has an olive branch, the emblem of peace; and is attended by sea-nymphs, who present her with crowns of palm and laurel. Here are also represented Neptune and his tritons, with several water-animals; the whole in marble, and the workmanship extremely curious. At each side and on the top of this pediment are placed three brazen statues, representing Justice, Fortitude, and Prudence; and behind it is a handsome dome or cupola, containing a great number of bells, which compose very musical chimes. In this front of the stadthouse are seven doors, or open arches, alluding to the seven provinces of the republic. The back front of the building has also a pediment, with an excellent bas-relief in marble, representing the extensive commerce of Amsterdam, under the emblem of a woman with a winged cap on her head, to whom the four parts of the world (denoted by proper figures) offer presents of their respective productions. On the sides of the pediment are the statues of Peace and Plenty, and on the top stands a large Atlas with a globe of copper on his shoulders. The inside of this stately fabric is decorated with a profusion of fine paintings, sculptures and other ornaments. The courts of judicature are lined with marble, and adorned with curious emblema-

* This mode of building is very common in the Netherlands where the ground is soft and marshy; so that not only the stadthouse, but the whole city of Amsterdam stands upon such foundations, viz., large piles of fir driven perpendicularly into the earth, or rather water, so close to each other that nothing can be forced between them. This, however, is a very expensive method; for the foundation of the stadthouse is said to have cost 100,000*l.*, sterling.

tical figures or historical pieces, relating to the distribution of justice; particularly a representation of Solomon passing judgment between the two harlots; and at the entrance of every office or chamber is some sculpture or other appropriate decoration.

A flight of stairs leads to the great hall, at the entrance of which are two strong folding-doors of brass, and several marble columns 20 feet high, supporting a most beautiful cornice. Over this cornice sits the figure of a woman bearing on her breast the city arms, while an eagle places on her head an imperial crown. At her feet are two lions; on one side is a statue of Fortitude, and that of Minerva on the other; and four naked children hover round her with cornucopias, pouring out fruits and flowers. The beauty and magnificence of this hall are hardly to be described; the stately marble pillars, the representation of the four elements at the corners, the exquisite paintings, statues, and other ornaments, at once surprise and charm the spectator: but the greatest curiosity is the marble floor, on which the celestial and terrestrial globes are represented in planisphere; the constellations in the one, and the several parts of the earth in the other, with the principle circles, being all delineated in brass, neatly laid into the marble, and the names of the countries expressed in a similar manner. Each hemisphere is about 22 feet in diameter, and the whole is universally admired, as a most ingenious performance. This structure cost three millions of guilders, or £300,000 sterling, when money was much more valuable than it is at present.—Smith's *Wonders.*

PALACE OF THE KING OF FRANCE, VERSAILLES.

Of all the palaces in France, that of Versailles, about nine miles from Paris, is indisputably the most magnificent. It stands on a rising ground, in the midst of a valley, surrounded with little hills at an agreeable distance, and rendered extremely pleasant by the avenues which lead to it; particularly that on the side toward Paris which consists of three spacious walks, formed by

rows of elms, and terminating in a large square called the *Place d' Armes.*

The outer court of the palace is surrounded with buildings, which were formerly inhabited by the secretaries of state, and leads into another court, which is paved with variegated marble, and adorned with a handsome fountain and basin. At the lateral angles of this court are two arcades, one leading to the south, the other to the north terrace.

The palace itself is said to be nearly 2,000 English feet in length, and consists of a ground-floor, a first-floor, and an attic story. The Ionic pilasters, and isolated columns of the same order, which adorn the front, are peculiarly elegant; and the entablature of the attic supports a beautiful roof crowned by balustrades, and ornamented with trophies, vases, *&c.*—SMITH'S *Wonders.*

MOSQUE OF ST. SOPHIA, CONSTANTINOPLE.

THOUGH the Turks affect nothing grand in the structure of their private houses, yet their mosques or temples, and other public buildings, are extremely magnificent. The royal mosques, in particular, are very beautiful and stately edifices, and are usually the first that engage the attention of a stranger after his arrival at Constantinople. These buildings appear to much more advantage than many of our finest churches, which (in London especially) are often so closely surrounded with houses and tradesmen's shops, that there is no room to view them at a proper distance; whereas the mosques of Constantinople stand single, within spacious enclosures, planted with trees, and adorned with fountains. The domes are well executed in most parts of Turkey, especially those of the mosques, which are of an exact proportion, and accompanied with smaller cupolas, which set them off to the eye, and give them a noble and majestic appearance. The slender steeples or pillars called minarets, which are somewhat like the Monument in London, terminating in small spires with gilded crescents on the top of them, are also a great ornament to the mosques, as well as to the cities,

many of them being of a noble height and bold workmanship.

The principal of the royal mosques is that of St. Sophia, which is advantageously situated on an eminence in one of the best and finest parts of Constantinople. It was formerly a Christian church, having been built in the sixth century, by the Emperor Justin, and afterwards enlarged and beautified by Justinian; and though the Turks have now converted it into a mosque, it still retains its ancient name. The length of this edifice is 114 paces, and its breadth 80, having in the front a portico 36 feet wide, supported by marble columns, which, in the time of the Greek emperors, served for a vestibulum, where such persons were appointed to stand as intended to receive the sacraments, or undergo public penance. This portico has a communication with the church by nine stately folding doors, the leaves of which are of brass, and adorned with fine bas-reliefs: and on the middlemost some figures of Mosaic work may still be discerned. Another portico, parallel to this, has only five brazen doors without bas-reliefs. but formerly charged with crosses, which the Turks have defaced.

The body of the mosque is covered by a dome of admirable structure, at the foot of which runs a colonnade, sustaining a gallery 10 yards broad, which, when the Christians were masters of it, was set apart for the women; and over this are two small galleries, supported by columns and arches of excellent workmanship, answering to those below. The dome is said to be 113 feet in diameter, and is built upon arches, supported by vast pillars of white marble. The incrustations of the gallery are Mosaic, mostly done with little cubes of glass, which by time are continually loosened from their cement, but their colour is fresh and unchangeable. The form of the dome is that of a hemisphere, or half globe, and it is illuminated by twenty-four windows placed round it at equal distances. It was formerly adorned by four cherubim and other figures; but these have been defaced by the Turks, who do not admit of any imagery or painting in their mosques.

On the east side of this vast cupola is a demi-dome, which was the sanctuary or chancel of the Christians;

and here is now a niche, wherein the Turks keep their Koran, containing the revelations, doctrine, and predictions, of their pretended prophet. This niche is in that part of the dome which stands towards Mecca, and the niches in all their mosques are placed in the same manner; for the Mahometans always turn their faces that way when they say their prayers.

At a little distance from the niche is the Mufti's chair*, raised on several steps, and on the side of it is a kind of pulpit, where certain prayers are repeated by persons appointed for that purpose. The Turks have been accused of pulling down some parts of this edifice since they took it from the Christians; but instead of this, they have added four of those tall slender minarets before mentioned. Every royal mosque has at least two minarets, and one of them has six; but the ordinary mosques have seldom more than one. About the middle of these, on the outside, there are usually three balconies or galleries, one above another, to which the Imaums ascend by stairs within, and, with a shrill singing tone, give notice to the people to come to their devotions.

The mosque of St. Sophia has been generally represented as the noblest building in Constantinople; but Lady Wortley Montague observes, that there are others still more beautiful. That of Sultan Solyman is an exact square, with four fine towers in the angles. In the midst is a noble cupola, supported by fine marble pillars, and two smaller at the end, supported in the same manner. The pavement and gallery round the mosque are of marble; and under the great cupola is a fountain adorned with pillars of the most beautiful colours.

On one side is a pulpit of white marble, and on the other a little gallery for the sultan, which is ascended by a fine staircase with gilt lattices. At the upper end is a kind of altar, where the name of God is written; and before it

* The Mufti is the high-priest or patriarch of the Mahometan religion, being the sovereign interpreter of the Koran, and the oracle of their law, to whom the last appeal is generally made in cases of importance. He takes place of the bashaws, and his authority has been often terrible to the Grand Seignior himself. It is he that girds on the sword to the Grand Seignior's side which ceremony answers to the coronation of our kings.

stand two candlesticks, five or six feet high, containing lofty wax candles. The windows are larger and better disposed than those of St. Sophia. The pavement is spread with fine carpets, and the mosque illuminated with a vast number of lamps. The court leading to it is very spacious, and encompassed with galleries, supported by columns of green marble; and on two sides it is covered with twenty-eight cupolas, with a fountain in the middle. In all the mosques are little chapels, containing the tombs of the founders and their families; and behind this structure are the tombs of Solyman II., by whom it was founded, and that of his sultana. Solyman's tomb is covered with a rich piece of embroidery, brought from Mecca; and at the head of it is placed a tuft of feathers, adorned with precious stones. This mausoleum is illuminated with seven large tapers, and a great number of lamps are kept continually burning.

MOSQUE OF SULTAN SELIM I. AT ADRIANOPLE

This structure is advantageously situated in the highest part of the city, whence it is seen to great advantage on every side. The first court has four gates, and the innermost three, both of them surrounded with cloisters, with marble columns of the Ionic order, finely polished, and of very lively colours. The whole pavement is of white marble, and the roof of the cloisters divided into several domes, with gilded balls on the top. In the midst of each court are fountains of white marble, and before the great gate of the mosque is a portico, with columns of green marble, and five gates. The mosque is covered by one prodigious dome of vast extent, and has also four minarets of a prodigious height, gilt on the top, from whence the Imaums call the people to prayers. To each of these towers there is but one door, which leads to three different staircases, rising to the three different stories of the minaret, in such manner, that three priests may ascend and descend without meeting each other. The lady just mentioned (who was perhaps the only Christian ever permitted to enter the inside of this noble mosque) says, it has two rows of galleries, supported by columns of red and white

marble, with marble balustrades; the pavement is also of marble, covered with fine Persian carpets. The walls are beautifully incrusted with Japan china, in flowers of the most lively colours. In the middle hangs a vast lamp of silver, gilt, and about two thousand of a smaller size, which must have a very brilliant effect when all are lighted. Under the large lamp is a pulpit of carved wood, gilt; and just by it a fountain to wash. In one corner is a little gallery, enclosed with gilded lattices, for the Sultan; and at the upper end is a large niche, nearly resembling an altar, raised two steps, and covered with gold brocade. Before it stands two silver gilt candlesticks, holding wax candles as thick as three flambeaux.—SMITH'S *Wonders.*

PALACE OF THE KING OF PORTUGAL.

THE most magnificent palace of the king of Portugal is situated at Mafra, in a sandy and barren spot, in pursuance of a vow made by King John V. to found a convent for the poorest friary in the kingdom. Upon inquiry, the meanest convent appeared to be at Mafra, where twelve Franciscans lived together in a hut. In order to accomplish this vow, the king procured from Rome the draught of a building, that was greatly to exceed the Escurial in Spain, and this he accordingly erected. In the centre stands a temple built entirely of marble; and behind the choir is a house, endowed with a large revenue for two hundred capuchins, who officiate as chaplains. To the right of this building, is a superb and spacious palace for the king, the royal family, and the chief officers of the court. On the left, is another palace for the patriarch and twenty-four canons, who have the privilege of wearing mitres. Twelve thousand people were employed in raising these structures, which are said to have cost three-fourths of the royal treasure, and of the gold brought by the Brazil fleets. At the distance of a mile from the church stands an elegant house, encompassed by a small wood, which, in this sandy waste, has a fine effect. The palace at Mafra being seated near the sea, serves for a land-mark.—SMITH'S *Wonders.*

REMARKABLE BRIDGES.

EXTRAORDINARY WOODEN BRIDGE AT SCHAFFHAUSEN.

The late bridge over the Rhine at Schaffhausen, in Switzerland, was of singular architecture, and worthy of particular attention. Several stone bridges had been carried away by the rapidity of the torrent, when a carpenter of Appenzel offered to throw a wooden bridge of a single arch across the river, which is nearly four hundred feet wide. The magistrates, however, required that it should consist of two arches, and that the middle pier of the old bridge should be employed for that purpose; but although the architect was obliged to obey, he contrived to leave it doubtful whether the bridge was supported by the middle pier, and whether it would not have been equally safe if formed after his own plan. A man of the lightest weight felt it vibrate under him, though waggons heavily laden might pass over it without danger. Its mechanism, though simple, was most extraordinary, and afforded a striking proof of the abilities of the man who projected and executed it without the least knowledge of mathematics, and, in fact, without the least pretensions to literature. This curious bridge was finished in less than three years, at the expense of 8,000*l.*; but it was burnt by the French troops, when they evacuated Schaffhausen, after being defeated by the Austrians in the spring of 1799.

FINE STONE BRIDGE AT BERN.

At Bex, in the canton of Bern, is a stone bridge over the Rhone, which is nearly 500 feet long, and consists only of one arch, of a considerable height, with a handsome tower on the top. And in the canton of Uri is a stone bridge, over the Russ, of a surprising height, consisting solely of one arch, resting upon two high rocks.

The neighbouring peasants have given it the name of "the Devil's Bridge," from a simple opinion that such a stupendous work must have been erected by the devil.—SMITH'S *Wonders.*

BRIDGES AT BADAJOZ, *&c.*

THERE is a handsome bridge over the Guadiana at Badajoz, consisting of thirty arches, and above 500 yards in length. At Saragossa, are two noble bridges over the Ebro, the one of stone, the other of wood, which latter is reckoned the finest of the kind in Europe; and the bridge over the Manzanarez, at Madrid, built by Philip II., is very long and magnificent. To these we must add the fine bridge over the Mondego, at Coimbra in Portugal, consisting of a double range of arches, one above another, forming a covered way, through which people pass, without being exposed to the weather.

WOODEN BRIDGE AT WETTINGEN.

THE wooden bridge of Wettingen, about a mile distant from Baden, is a most admirable piece of mechanism, 240 feet in length, and suspended above 20 feet from the surface of the water. Mr. Coxe observes, that he shot under this bridge with such velocity, that in the moment he was admiring its bold projection on one side, he suddenly found himself on the other. This is said to have been the last work of the self-taught artist who constructed the famous bridge at Schaffhausen.

CURIOUS BRIDGE OVER THE TAGUS.

As the Romans were a long time masters of Spain, the remains of their ancient structures are to be seen in several parts of the kingdom. There is a magnificent bridge over the Tagus, at Alcantara, which was built in the reign of the Emperor Trajan, and consists of no more than six arches, though it is upwards of 600 feet in length; its

height is said to be 200 feet above the water.—SMITH'S *Wonders.*

NATURAL BRIDGE.

THE natural bridge of Virginia is one of the most sublime of Nature's works, and consequently demands a place in a work of this nature. It is on the ascent of a hill, which seems to have been cloven through its length, by some great convulsion. The fissure just at the bridge is, by some admeasurements 270 feet deep, but by others only 205. It is about 45 feet wide at the bottom, and 90 at the top; which of course determines the length of the bridge, and its elevation from the water. Its breadth in the middle is about 60 feet, but more at the ends, and the thickness of the mass at the summit of the arch is about 40 feet. A part of this thickness is constituted by a coat of earth, which gives growth to many large trees; and the residue, with the hill on both sides, is one solid rock of lime-stone. The arch approaches the semi-elliptical form, but the larger axis of the ellipses, which would be the cord of the arch, is several times longer than the transverse.

Though the sides of this bridge, says Mr. Jefferson, are provided in some parts with a parapet of fixed rocks, yet few persons have resolution to walk over them, and look over into the abyss. You involuntarily fall on your hands and knees, creep to the parapet, and peep over it. Looking down from this height about a minute gave me a violent head-ach. But if the view from the top be painful and intolerable, that from below is delightful in an equal extreme. It is impossible, indeed, for the emotions arising from the sublime to be felt beyond what they are here; so beautiful an arch, so elevated, so light, and springing as it were up to heaven, the rapture of the spectator is really indescribable! The fissure continuing narrow, deep, and straight for a considerable distance above and below the bridge, opens a short but very pleasing view of the North Mountain on one side, and Blue Ridge on the other, at the distance each of them of about five miles. This bridge is in the county of Rock-bridge, to which it has given name, and affords a public and commo-

dious passage over a valley, which cannot be crossed elsewhere for a considerable distance. The stream passing under it, called Cedar creek, is a water of James river, and is sufficient in the driest seasons to turn a grist-mill, though its fountain is not more than two miles above.

BRIDGE OF BOATS.

The bridge of boats, at Rouen, built in lieu of the magnificent stone bridge erected there by the Romans, is mentioned by a modern writer as one of the greatest wonders of the present age. It is nearly 900 feet long; paved with stone, and so firm, that horses and carriages with the greatest burthens pass over it in perfect safety, although there are no rails on either side. It always floats, and rises with the tide, or as the land-waters fill the river. The boats are admirably moored with strong chains, and the whole is constantly repaired, though now very old.—Smith's *Wonders*.

CURIOUS TIMBER BRIDGE.

The principal bridge in any of the United States is that which was built over Charles river, between Boston and Charleston, in the year 1786. This structure is 1,503 feet in length, being built on 75 piers, and having a draw of 30 feet in width. The abutment at Boston to the old landing is 45½, and that at Charleston, from the old landing, is 100 feet.

Each pier consists of seven sticks of oak timber, united by a cap-piece, strong braces, and girts; driven into the bed of the river, and secured by a single pile on each side, driven obliquely to a solid bottom. The piers are also connected to each other by large pieces, covered with four-inch plank. The bridge has a gradual rise from each end, so as to be two feet higher in the middle than at the extremities: it is about 43 feet in width, and on each side is a passage six feet wide, railed in, for the safety of foot passengers. Forty elegant lamps are erected at a suitable distance from each other, to illuminate it when necessary.

The draw is constructed on a capital plan: the machinery is very simple, and it requires the strength of two men only in raising it. The floor on the bridge, at the highest tides, is four feet above the water, which generally rises about 12 or 14 feet.

This bridge, says Dr. Moore, was completed in 13 months; and while it exhibits the greatest effect of private enterprise within the United States, it is a most pleasing proof how certainly objects of magnitude may be attained by spirited exertions.

FINE STONE BRIDGE AT ZULPHA.

The bridge at Zulpha, one of the suburbs of Ispahan, is represented by Tavernier and Thevenot as one of the finest structures in Persia. It is built of brick with edgings of free-stone, and is almost level, the middle of it being not much higher than the ends. It is above 300 paces in length, and 20 in breadth, and is supported by a great number of low stone arches. On each side is a gallery eight or nine feet broad, which runs from one end to the other, raised several steps above the level of the bridge, and having frequent openings for the sake of light, fresh air, and a prospect of the river. If a person desire a more open passage, he may walk upon the platform over these galleries, but here the passenger is so much exposed to the heat of the sun in summer, that he generally chooses the covered walk; which also serves for a horse-way in winter, when the river overflows and fills the middle way of the bridge, which is designed for horses. But what is most remarkable is another passage, when the water is low in summer, which is peculiarly agreeable on account of its coolness. This way is almost even with the bottom of the river, but there are stones so placed that one may step over without wetting one's shoes; and openings are made through the piers from one end of the bridge to the other.—Smith's *Wonders.*

FINE BRIDGE OVER THE RHONE.

We shall now proceed to the description of a structure of a very different kind, but too remarkable to be omitted, *viz.*, the famous bridge over the Rhone, at St. Esprit, in Languedoc, which is reckoned one of the finest in Europe. This bridge is of stone, and of a great length, consisting of twenty-six arches, whose piers are secured by two pedestals that surround them, which have their projectures like rows of steps or stairs, the lowermost projecting most, the others less by degrees. Above these are several small arches, which divide the feet of the great ones, and reach as low as the plane to the uppermost pedestal. As the Rhone is a very rapid river, this bridge is admirably contrived to withstand its violence; for the unequal juttings of the pedestals serve gradually to break the force of the stream, and when the flood swells so high as to cover them, (which it frequently does,) the small arches, or openings, in the piers give a free passage to the water, which might otherwise endanger the fabric. Besides the bridge is not straight, but bent in several places, forming unequal angles, which are greatest where the current is strongest, and thereby its fury is opposed and broken. Dr. Smollett, mentioning this bridge, observes, that it is a great curiosity from its length, and the number of its arches; but that the arches are too small, the passage above is too narrow, and the whole appears too slight to resist the impetuous force of the river.

THE PONT NEUF.

The Pont Neuf, at Paris, was begun in the reign of Henry III., that monarch having laid the first stone upon the 31st of May, 1578: but it was not completed till the year 1604. It consists of 12 arches: is 1,020 feet long, and 72 feet broad, of which the carriage-way is 30 feet, and the rest is taken up by a foot-path raised on each side. Over each pier is a semicircular parapet, round which there is a cornice, resting on large consoles, and adorned with busts

PONT DE NEUILLY.

The Pont de Neuilly, or Bridge of Neuilly, is generally considered as one of the finest pieces of architecture in France, both on account of the slightness of its construction, and the hardiness of its execution. It is perfectly horizontal, being about 800 feet long, and consisting of five arches, the vaults of which are depressed in the centre, having an opening of 130 feet, and a height of about 32 feet beneath the key-stone.—Smith's *Wonders.*

THE RIALTO AT VENICE.

The famous bridge at Venice, called the Rialto, is universally allowed to be one of the finest in Europe. It was built in the year 1591, from a design of the celebrated Michael Angelo, and is said to have cost 250,000 ducats. It consists of a single arch, all of marble; has rails on each side, and two rows of shops in the middle. The dimensions of this bridge are as follow: the compass of the arch is exactly one third part of a circle; its width on the level of the water, from one extremity to the other, is 95 feet, and its height 24.

ROPE BRIDGE IN SOUTH AMERICA.

Instead of a bejuco bridge, some rivers are passed by means of a tarabita, which is a single rope, either made of bejucos, or thongs cut from the hide of an ox, and consisting of several strands, which, when twisted, form a rope of six or eight inches in thickness. This is extended across the river, and fastened on one side to a strong post, and on the other to a wheel, that it may be straitened or slackened as occasion serves. From the tarabita hangs a kind of leathern hammock, large enough to contain a man, and suspended by a clue at each end, hanging in a loop over the tarabita. A rope is also fastened to it, and extended over the river, for drawing the hammock to the side intended; which, with a push at its first setting off, sends it quickly to the other side. This not only serves

THE RIALTO AT VENICE.

to carry over persons, but the burthens of beasts, and also the animals themselves, where the rapidity of the current, and the weight of a man passing over, must cause it to make a prodigious bend; and if it be considered that the passenger, when in the midst of his course, especially if there be a wind, is exposed to be swung from side to side, a bridge of this sort, sometimes above 90 feet long, must appear extremely frightful; yet the Indians run over it, loaded with the baggage and pack-saddles of the mules, laughing to see the Europeans afraid of venturing. The greatest part of these bridges are only for men and women, the mules swimming over the rivers; for their loading being taken off, they are driven into the water about a mile and a half above the bridge, in order that they may reach the opposite shore near it, they being usually carried so far by the rapidity of the stream.—SMITH's *Wonders*.

FLYING BRIDGES AT CHINA.

BEFORE we dismiss the subject of foreign bridges, we ought to mention some of the Chinese bridges, which may be looked upon as wonderful pieces of art, scarcely to be paralleled by any thing of the kind in Europe. The most surprising of these structures is that which has obtained the name of the flying bridge, from its being built over a river from one mountain to another, and consisting only of one single arch, 500 cubits high, and 400 long.

There is another remarkable bridge in the province of Shansi, at the conflux of two large rivers, which is built upon 130 barges chained together, but so contrived as to open and admit vessels to pass through, after paying the usual toll. This sort of bridge is common in China; but they have another sort built upon pillars without any arches, and some of these of a great length and breadth; particularly one in the province of Fo-kien, which is 360 perches long, and 1½ broad. It is all of white stone, supported by 300 pillars; has a parapet on each side, and is adorned with the figures of lions at certain distances, and a variety of other sculptures.

Some of their arched bridges are likewise of consi-

derable length, breadth, and beauty; especially that of Fuchew, the capital of Fo-kien, which is above 150 perches long, and consists of 100 lofty arches. The parapets of this bridge are also adorned with figures of lions and other animals.—SMITH'S *Wonders*.

BRIDGES OVER THE RIVER THAMES.

LONDON BRIDGE.

THIS bridge is of great antiquity, and was for many ages encumbered with houses built on each side. It was improved, and put into its present condition in 1756. It is 915 feet long, and 45 wide; and its centre is 60 feet high. It has 19 arches, but no two alike. The centre arch is semicircular, and was built in 1756 by throwing two into one, and is now 72 feet in diameter. The others are of different forms, and run from 8 to 20 feet wide. But of this bridge it is not requisite to say more, as in the month of July, 1825, the first stone of the

NEW LONDON BRIDGE

was laid. It is to consist of 5 arches; and is rapidly completing, under the direction of John Rennie, Esq. Its dimensions are as follow:—

	FEET.
The length of the Bridge including the abutments	933
The length of ditto, within the abutments	782
Width of the bridge, from outside the parapet	50
Carriage way	33½
Span of centre arch	150
Piers to ditto	24
Span of the two arches next the centre	140
Piers to ditto	22
Span of the abutment arches	130
Clear water-way under the five arches	690
The abutment at each end of the Bridge	74

BLACKFRIARS BRIDGE.

THIS bridge consists of nine arches, which being elliptical, the apertures for navigation are large, while the bridge itself is low. When a person is under one of these arches, the extent of the vaults overhead cannot be viewed without awe!

The upper surface of this bridge is a portion of a very large circle; so that the whole forms one arch, and appears a gentle swelling ground under foot all the way. Over each pier is a recess, or balcony, containing a bench, and supported below by two Ionic pillars and two pilasters, which stand on a semicircular projection of the pier, above high-water mark. These pillars give an agreeable lightness to the appearance of the bridge on either side. At each extremity of the bridge spreads open the foot-ways, rounding off to the right and left a quadrant of a circle, by which an open access is formed, no less agreeable than useful on the approach.—NORTHOUKE's *History of London.*

The centre arch of this fine bridge is exceeded by very few in the world, and is considerably larger than that of the Rialto at Venice. The expense of the erection of this bridge is said to have amounted to £152,840.

WESTMINSTER BRIDGE.

WESTMINSTER BRIDGE is universally allowed to be one of the finest in the world. The first stone of this noble structure was laid on the 29th of January, 1738, by the Earl of Pembroke, and was finished and opened on the 17th of November, 1750. It is adorned and secured on each side by a very lofty and noble balustrade. Over every pier is a recess on each side, forming a semioctagon, and twelve of these are covered with half domes, four at each end, and four in the middle. Between those in the middle are pedestals, which were intended to support a group of figures, and the whole is lighted in the night by a great number of lamps beautifully disposed.

This magnificent structure is 1,223 feet in length, and 44 in breadth. The space allowed for passengers consists of a commodious foot-way, 7 feet broad on each side, paved with broad moor-stone; and the intermediate road is sufficient to admit the passage of three carriages and two horses a-breast. The bridge consists of thirteen large and two small arches, with fourteen intermediate piers. The arches are all semicircular, and spring from about 2 feet above low-water mark; the centre arch is 76 feet wide, and

the rest decrease in width equally on each side by four feet; and the free course for the water under the arches is 870 feet, so that there is no sensible fall of water. The foundation is laid on a firm and solid mass of gravel, which lies at the bottom of the bed of the river; but at a much greater depth on the Surrey than on the Westminster side; and this inequality of the ground required the length of the several piers to be very different, as some have their foundations laid at 5, and others at 14 feet under the bed of the river. The piers are all 4 feet wider at their foundations than at their top, and are founded on the bottoms of the wooden cases on which they were built. All the piers consist of solid blocks of Portland stone, many of which are four or five tons weight, and none less than a ton, except the closers, or smaller stones, intended for fastening the rest, one of which is placed between every four of the larger blocks.—SMITH'S *Wonders*.

WALTON BRIDGE,

CONSISTS only of four stone piers, between which are three large truss arches of beams, and joists of wood, strongly bound together with mortises, iron pins, and cramps; under these three arches the water constantly runs; besides which, are five other arches of brick-work on each side, to render the ascent and descent the more easy; but there is seldom water under any of them, except in great floods, and four of them are stopped up, they being on high ground above the reach of the floods.

The middle arch, when viewed by the river-side, affords an agreeable prospect of the country, beautifully diversified with wood and water which is seen through it to a considerable distance. The prodigious compass of this great arch, to a person below, occasions a very uncommon sensation of awe and surprise; and his astonishment and attention are increased, when he proceeds to take notice, that all the timbers are in a falling position; for there is not one upright piece to be discovered; and at the same time considers the very small dimensions of the piers by which the whole is supported.

In passing over this bridge, when you have proceeded past the brick-work, the vacant interstices between the timbers, yield, at every step, a variety of prospects, which, at the centre, are seen to a still greater advantage; but though each side is well secured by the timber and rails, to the height of eight feet, yet as it affords only a parapet of wide lattice-work, and the apertures seem, even to the eye, large enough to admit the passage of any person to go through, provided he climbs, or is lifted up, and as the water is seen through every opening, at a great depth below, those unused to such views cannot approach the side without some apprehensions.

It would, indeed, have been easy to have closed these openings between the braces and rails with boards; but they are purposely left open to admit a free passage for the air, in order to keep the timbers the more sound, and that the least decay may the more easily be perceived and repaired.

From this admirable bridge the nobility and gentry in this neighbourhood find a very agreeable benefit, especially as the ferries are dilatory, dangerous, and at times impassable; and its being erected has caused the roads thereabouts in both counties, especially on the Surrey side, to be greatly improved.

WATERLOO BRIDGE.

To commemorate the battle of Waterloo, the Prince Regent, the Duke of York, and the Duke of Wellington, opened this fine bridge on the 18th of June, 1817.

It is a well-proportioned and handsome structure, composed of nine arches, of equal span and elevation, supported by stone piers, and ornamented by two columns, and the whole crowned by an elegant balustrade. This undertaking was carried on by a joint-stock company, under the auspices of parliament, and is one of the most beautiful ornaments of the metropolis. The length of it exceeds that of any of the other metropolitan bridges, being 1,240 feet from shore to shore, and is perfectly level,

like the bridges of the ancients. It is 42 feet in width, *viz.*, 7 feet for each foot-path, and 28 for the road-way, and is considered by travellers as one of the handsomest bridges in the world. It was built under the superintendence of John Rennie, Esq.

The foundation-stone of Waterloo Bridge was laid on Friday, October 11, 1811, by the directors for executing the same, Henry Swann, Esq., M. P., chairman, in the fifty-first year of the reign of King George III., and during the Regency of H. R. H. George, Prince of Wales.

	FEET.
The length of the bridge within the abutments - -	1240
Length of the road supported on brick arches on the Surrey side - - - - - - - -	1250
Do. on the London side - - - - - -	400
Total length from the Strand, where the building begins, to the spot in Lambeth, where it falls to the level of the road - - - - - - - - -	2890
Width within the balustrades - - - - -	42
Do. of foot way on each side - - - - -	7
Do horse and carriage-road - - - - -	28
Span of each arch - - - - - - -	120
Thickness of each pier - - - - - -	20
Clear water-way under the nine arches, which are equal	1080
The number of brick arches on the Surrey side - -	40
Number of brick arches on the London side - -	16

Carriage-road under the eleventh arch 26 feet span, on the Surrey side, leading to Westminster bridge.

SOUTHWARK BRIDGE.

THE first stone of this bridge was laid by Lord Keith, in the centre of the river, on Tuesday, May 23, 1815; and on the 7th of June, 1817, being the fifty-seventh year of the reign of his Majesty George III., and in the regency of H. R. H. George, Prince of Wales, the Right Hon. Matthew Wood, Lord Mayor of London, attended by several of the aldermen and the sheriffs of the city, accompanied by the committee of management, of which Sir John Jackson, Bart., M. P., was chairman, laid the first stone of the north, or London, abutment of this bridge,

which connects the City of London with the Borough of Southwark.

	FEET.
Length of iron bridge within abutments	700
Width within the balustrade	42
Ditto of paved foot-way on each side	7
Ditto of carriage-way	28
Thickness of each pier	24
Span of centre arch	240
Ditto of outside arches	210
Clear water-way under the three arches	652
Span of the first brick arch on the London side from the river, for the carriage-road leading to the wharfs	24
Span of each of the nine brick arches on the London side	15
Span of the first brick arch on the Surrey side from the river, for carriage-road leading to Blackfriars bridge	25
Span of the seventeenth arch, over Maid-lane, on the Surrey side, for carriage-road	24
Span of each of the twenty brick arches on the Surrey side	15
Total number of brick arches 32.	
Length of the road supported on brick arches on the London side	250
Length of the road supported on brick arches on the Surrey side	528
Total length, including the bridge	1478

Weight of iron in the middle arch 1,665 tons; in the two side arches 2,920 tons—total 4,585 tons. Messrs. Walker and Co., Rotherham, Yorkshire, were the founders of the iron-work; Mr. John Rennie, F.R.S., architect and engineer; and Messrs. Jolliff and Banks, contractors. The success which has attended the building of this bridge settles the question as to the practicability of erecting bridges of such extraordinary span. The centre arch of this bridge is the largest that exists in the world; its span is four feet more than that of the famous bridge at Sunderland; and it is 38 feet more in span than the Monument is in altitude. The whole expense of this truly national work, and of forming the avenues leading to it, is estimated at about £650,000.

ANTIQUITIES.

THE STATUES OF MEMNON.

FRONTING the Nile, at a considerable distance from the temple, are the colossal statues of Memnon, consisting of a man and woman in a sitting posture, both of them 50 feet high, from the bases of the pedestals to the top of their heads. They are seated upon stones 15 feet high, and as many in breadth; but the back part of each stone is higher than the fore part by a foot and a half; and they are placed on plain pedestals two feet high. The statue to the north has been broken off in the middle, and been built up with five tiers of stone, but the other is of one single stone: the feet have the toes broken off, and the features are mouldered away by time. The sides of their seats are covered with hieroglyphics. On the pedestal of the statue, which has been broken, is a Greek epigram; and on their insteps and legs are several Greek and Latin inscriptions; some of these epigrams are in honour of Memnon, but most of them are the testimonies of those who have heard his sound; one of them being the famous statue of Memnon, which, at the first and second hour, it is pretended, uttered a sound, occasioned by the rays of the sun striking upon it.

THE STRASBURGH HORN.

AMONG the curiosities of Strasburgh cathedral is a large horn, of which the following story is related:—About four hundred and twenty years ago, the Jews formed a conspiracy to betray the city of Strasburgh, and with this identical horn they promised to give the enemy notice when to commence an attack. But the plot being fortunately discovered, many of the traitors were burnt alive, and the rest were plundered of their effects, and driven into banishment. The horn is sounded twice every night

from the steeple of the cathedral, in gratitude for such a signal deliverance; though the Jews deny every circumstance of the story, except the harsh treatment of their countrymen.

THE CRETAN LABYRINTH.

In Candia, the ancient Crete, a large island in the Mediterranean, there is a subterranean maze, or labyrinth*, which pervades the whole inside of a hill at the foot of Mount Ida, three miles from the ruins of Goatyna. The entrance of this labyrinth is seven or eight paces broad, but so low that a man cannot pass it without stooping. The bottom of it is extremely rough and uneven; but the roof is flat, being formed of beds of stone lying horizontally one upon another. Proceeding forwards through a sloping cavern, we soon meet with innumerable turnings and windings, so irregular and intricate, that if any person happen to strike into one of them out of the main path, or alley, he is in great danger of being bewildered and lost. To prevent this, strangers seldom deviate to the right or left, but keep along the principal alley; and to find the same way back again the more easily, they scatter straw on the ground, stick up bits of paper at every turning, or take some other precaution of that nature.

The chief passage is about seven feet high; and the greatest part of it is wide enough for three or four persons to walk a-breast; but, in some places, a man must stoop a little, and in one part he is obliged to creep upon his hands and knees to get along. It is near a mile from the entrance to the end of the labyrinth, where the walk divides itself into two or three branches, and terminates in circular rooms cut out of the rock, in which strangers rest themselves with pleasure.

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* This labyrinth is the most famed in history or fable, having been rendered particularly remarkable by the story of the Minotaur and of Theseus, who found his way through all the windings by means of Ariadne's clue. It is supposed that Dædalus constructed this labyrinth on the model of that of Egypt, though on a less scale. The former was, according to Pliny, subsisting in his time, after having stood 3,600 years. It stood on the banks of the lake Mœris, and consisted of twelve large contiguous places, containing 3,000 chambers, 1,500 of which were under ground.

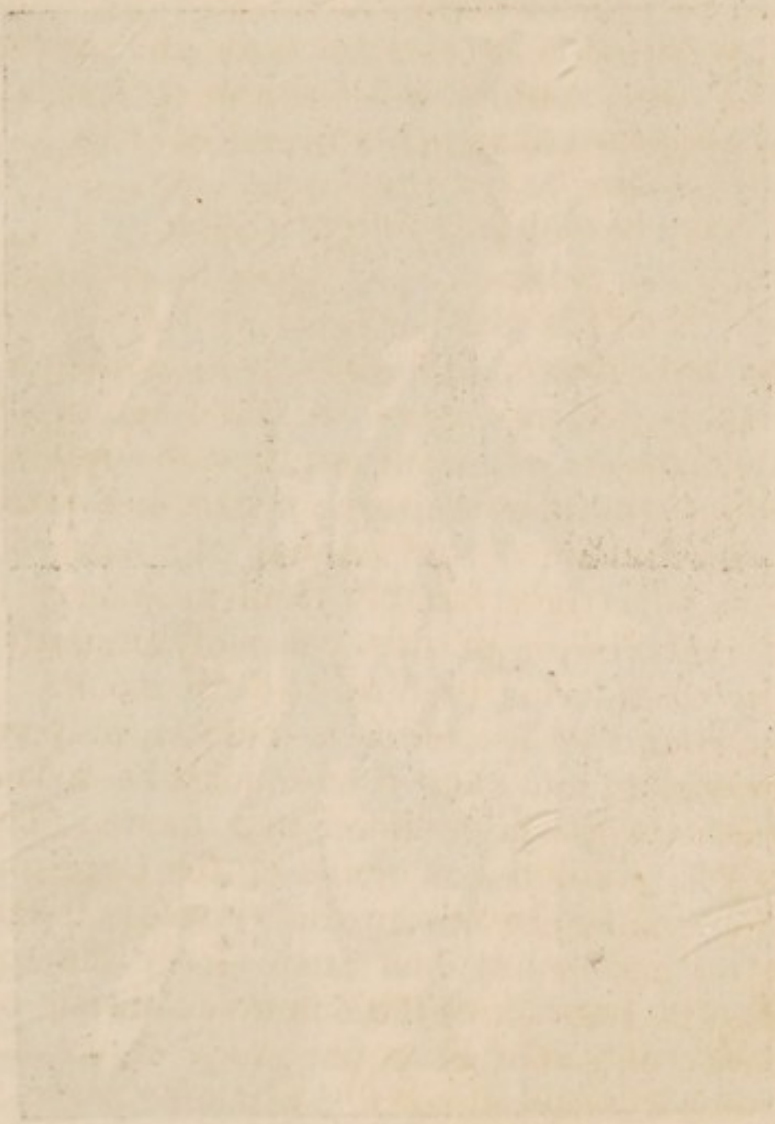
Belonius and some other authors have imagined that this wonderful labyrinth was originally a quarry, out of which stones were dug for the building of Gnossus and Gortyna; but M. Tournefort, who thoroughly considered the matter, gives several strong reasons against such an hypothesis. He thinks it much more probable, that it was at first a natural cavity, which some persons had the curiosity to enlarge, by widening the passages, and taking down some strata of stone to heighten the roof; for the Cretans, he observes, were a polite people, devoted to arts as well as arms, and took delight in perfecting the rude sketches of nature.—SMITH's *Wonders.*

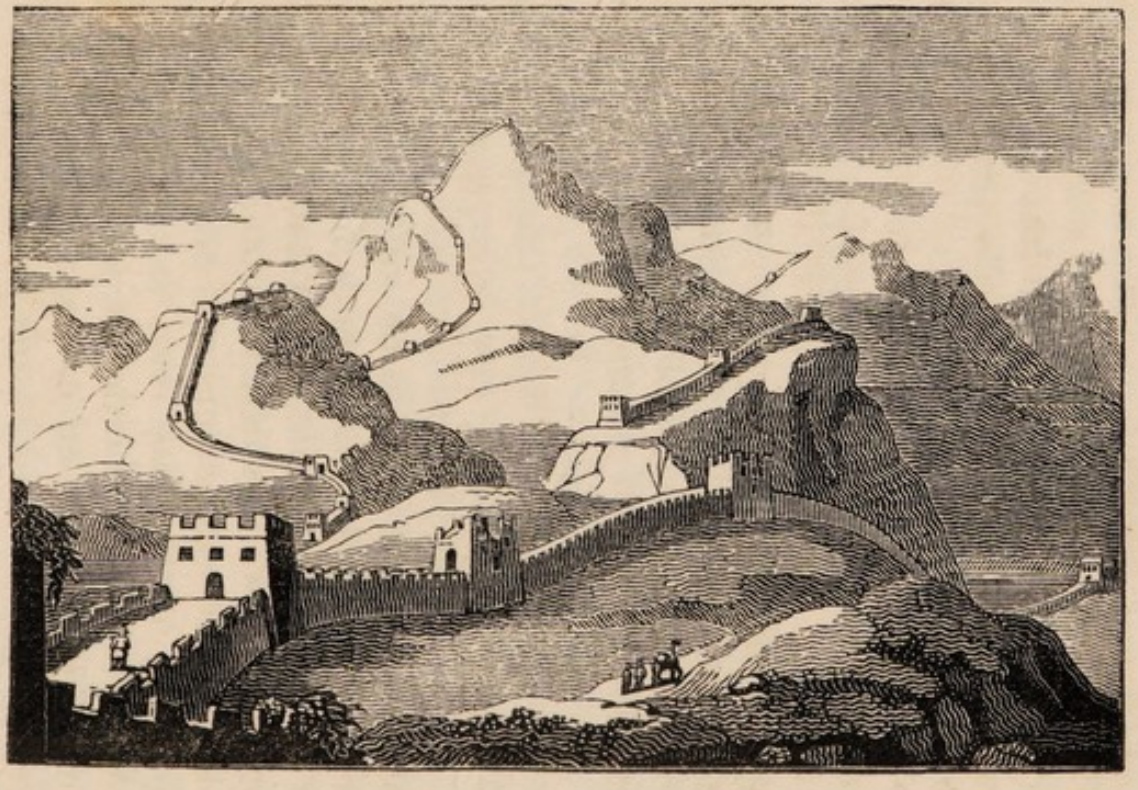
THE LANTERN OF DEMOSTHENES.

IN the south-west part of Athens stands a beautiful little structure, commonly called the Lantern of Demosthenes, on account of a tradition, that the orator shut himself up there, in order to pursue his studies without interruption, having first cut off one half of his beard, the more effectually to restrain himself from appearing in public. But the real design of this piece of antiquity will best appear by considering its form and ornaments.

It is a round edifice of white marble, only six feet in diameter within, and shaped so much like a lantern that it is no wonder it has obtained that name. The roof is supported by six fluted columns of the Corinthian order, 9½ feet high; and the intermediate space is taken up with pannels of marble, of one stone from the top to the bottom. The frize above the columns consists of one circular stone; and another entire stone forms the roof, or cupola, which is carved so as to resemble scales lying one over another, and crowned with a sort of stem, like the socket of a candlestick, or rather like a plume of feathers.

On the frieze are beautifully represented, in relievo, several of the labours and exploits of Hercules, as is judged from some of the figures being clothed with lion's skins. There is also an inscription on the frieze, which gives some reason to conjecture, that this fabric was a temple dedicated to Hercules by those who had been vic





THE GREAT WALL OF CHINA.

ors in the public games. Be this as it will, it is evidently of great antiquity, and appears to have been built above 330 years before the Christian era.

CHARLEMAGNE'S CROWN.

The city of Nuremberg, in the circle of Franconia, has the charge of most of the imperial ornaments which are said to have been the property of Charlemagne, and are always used at an emperor's coronation. These are Charlemagne's crown, which weighs fourteen pounds, and is enriched with a great profusion of rubies, emeralds, pearls, and diamonds; the Dalmatic robe, or mantle, richly embroidered with large pearls; Charlemagne's sword; the golden globe and sceptre; the imperial mantle, elegantly embroidered with eagles, and bordered with emeralds, chrysolites, diamonds, and sapphires; the buskins, covered with plates of gold; and the coronation gloves, embroidered with a variety of precious stones.

THE GREAT WALL OF CHINA.

One of the greatest curiosities, of the artificial kind, that China affords, and which may be reckoned one of the most astonishing remains of antiquity now in theworld is that prodigious wall, which was built by the Chinese to prevent the frequent incursions of the Tartars. This wall, Du Halde informs us, is higher and broader than the common walls of the cities of China; that is, about 25 feet in height, and broad enough for six horsemen to ride a-breast upon it; and it is fortified all along with strong square towers at proper distances, to the number of 3,000, which, in the time of the Chinese monarchs, before the Tartars subdued the country, used to be guarded by a million of soldiers. The whole length of it, with all its windings, is computed at near 1,500 miles, running all along the three northern provinces of Pekeli, Shansi, and Shensi, and built on some places which seem inaccessible, as well as over rivers and such marshes and sandy hollows, as appear utterly incapable of admitting a founda

tion for so weighty a structure. It is chiefly built of brick, and so strongly cemented with an extraordinary kind of mortar, that though it has now stood above 2,000 years, exposed to all winds and weathers, it is very little decayed; and the terrace on the top seems still as firm as ever. This amazing wall was built by the Emperor Chihohamt, according to some authors, or Tsinshiw-hang, according to Du Halde, above 200 years before the birth of our Saviour; and, though of such stupendous length and bulk, and carried on over mountains and valleys, it was completed within the space of five years, if we may credit the Chinese tradition.—SMITH's *Wonders.*

SHRINE OF JASPER.

IN the cathedral church of Cologne is a large purple shrine, spotted with gold, and set upon a pedestal of brass, in the middle of a square mausoleum, faced both within and without with jasper. This shrine is said to contain the remains of the three wise men, who went to Bethlehem in order to worship the Messiah, and who are said to have been removed, first to Constantinople, then to Milan, and finally to Cologne. They are generally called the three kings of Cologne: and their names, which are Gaspar, Melchior, and Balthasar, are written in purple characters upon a little grate, that is adorned with a remarkably large oriental topaz, and a profusion of pearls and precious stones. Over against the shrine are six large silver branches, perpetually illuminated with wax candles. This celebrated shrine is said to be opened every morning at nine o'clock, when the wise men are seen at full length, each having on his head an elegant crown of gold, richly garnished with jewels.—SMITH's *Wonders.*

ANTIQUITIES AT ATHENS.

THE antiquities of Athens are still so numerous, notwithstanding the ravages that time and barbarism have made among them, that they exceed those of any city in the world. Rome only excepted. That which claims our

first attention is an ancient Temple of Minerva, (now a Turkish mosque) which is all built of white marble, and is, perhaps, the most beautiful piece of antiquity now in being. It is about 218 feet in length, and 98 in breadth; and has on every side an ascent of five steps, that seem contrived as a basis to the portico, which is supported by channelled pillars of the Doric order, running all round the temple. These pillars are 46 in number, 42 feet high, and 17½ in circumference. The front and frize round about the temple were charged with historical figures of admirable workmanship, many of which were standing about 100 years ago. The back-front was adorned with figures, representing the contest between Neptune and Minerva, about naming the city of Athens; but they are all fallen down. The architrave was also charged with bas-reliefs, cut in squares at several distances, which represented the wars of the Athenians, particularly their victory at Marathon, and that over the Gauls in Mysia.

Within the portico we see a range of sculptures, whi are undoubtedly coeval with the temple itself, and of excellent workmanship, representing sacrifices, processions, and other ceremonies of the heathen worship. This, like other Pagan temples, was almost entirely dark within, having no other light but what came in at the doors; but there is now a window at the east end of it, which was made by the Greek Christians when they were in possession of it, and used it for divine service. Towards the bottom of this window are several stones, which admit through them a yellowish light, and have been said to shine in the dark, but are in reality only a kind of transparent marble*.

As to the founders of this beautiful temple, the body of it was built by Pericles, to which Attalus added the magnificent portico; but the Emperor Adrian most pro-

* This is the sort of marble, as Sir George Wheeler observes, which Pliny calls Phengites; and the Temple of Fortune, built by Nero, was of this stone, which by its transparency supplied the want of windows, so that the inside received light enough, even when the doors were shut. It was anciently found in Cappadocia; but it is far from being peculiar to that country, very beautiful pieces of it having been found in France, Germany, and some parts of England

bably repaired it, and adorned it with the figures on each front; for the whiteness of the marble, and that emperor's statue among the figures, plainly show those sculptures to be of a later date than the temple itself.—SMITH'S *Wonders.*

DESCRIPTION OF MODERN ATHENS

First sight of Athens.—At four o'clock in the afternoon, being off Cape Vari, and upon the look-out towards the N. N. E. we beheld, with great transports of joy, the first sight of Athens; its lofty edifices catching the sun's rays, and rendering the buildings in the Acropolis visible to us at the distance of 15 miles. The reflected light gave them a white appearance. The Parthenon appeared first, above a long chain of hills in the front; presently we saw the top of Mount Anchesmus, to the left of the temple; the whole being backed by a lofty mountainous ridge, which we supposed to be Parnes.

Approach to Athens.—As we drew near to the walls, we beheld the vast Cecropian Citadel, crowned with temples that originated in the veneration once paid to the memory of the illustrious dead, surrounded by objects telling the same theme of sepulchral grandeur, and now monuments of departed greatness, mouldering in all the solemnity of ruin. So paramount is this funeral character in the approach to Athens from the Piræeus, that, as we passed the hill of the Museum, which was in fact an ancient cemetery of the Athenians, we might have imagined ourselves to be among the tombs of Telmessus, from the number of the sepulchres hewn in the rock, and from the antiquity of the workmanship, evidently not of later date than any thing of the kind in Asia Minor. In other respects the city exhibits nearly the appearance so briefly described by Strabo eighteen centuries before our coming; and perhaps it wears a more magnificent aspect, owing to the splendid remains of Hadrian's Temple of Olympian Jove, which did not exist when Athens was visited by the disciple of Xenarchus. The prodigious columns belonging to this temple appeared full in view between the Citadel and the bed of the Ilissus; high upon our left, rose the Acropolis, in the most impres-

sive grandeur; at an advanced part of the rock, upon the western side of it, is the Hill of the Areopagus, where St. Paul preached to the Athenians, and where their most solemn tribunal was held. Beyond all, appeared the beautiful Plain of Athens, bounded by Mount Hymettus. We rode towards the craggy rock of the Citadel, passing some tiers of circular arches at the foot of it; these are the remains of the Odéum of Herodes Atticus, built in memory of his wife Regilla. Thence continuing to skirt the base of the Acropolis, the road winding rather towards the north, we saw also, upon our left, scooped in the solid rock, the circular sweep on which the Athenians were wont to assemble to hear the plays of Æschylus, and where the Theatre of Bacchus was afterwards constructed.

Recent spoliation of the Temples.—Some workmen employed under Lusieri's direction for the British Ambassador, were then engaged in making preparation, by means of ropes and pulleys, for taking down the metopes, where the sculpture remained the most perfect. The Disdar himself came to view the work, but with evident marks of dissatisfaction; and Lusieri told us that it was with great difficulty he could accomplish this part of his undertaking, from the attachment the Turks entertained towards a building which they had been accustomed to regard with religious veneration, and had converted into a mosque. We confessed that we participated the Mahometan feeling in this instance, and would gladly see an order enforced to preserve, rather than to destroy such a glorious edifice. After a short time spent in examining the several parts of the temple, one of the workmen came to inform Don Battista that they were then going to lower one of the metopes. We saw this fine piece of sculpture raised from its station between the triglyphs; but the workmen endeadouring to give it a position adapted to the projected line of descent, a part of the adjoining masonry was loosened by the machinery, and down came the fine masses of Pentelican marble, scattering their white fragments with thundering noise among the ruins. The Disdar, seeing this, could no longer restrain his emotions; but actually took his pipe from his mouth, and, letting fall a tear, said in a most emphatical tone of voice, "Τελος!" positively declaring that nothing should induce him to consent to any further

dilapidation of the building. Looking up, we saw with regret the gap that had been made; which all the ambassadors of the earth, with all the sovereigns they represent, aided by every resource that wealth and talent can now bestow, will never again repair.

Population and Trade of Modern Athens.—The population of Athens amounts to 15,000, including women and children. The principal exports are honey and oil; of the latter they send away about five vessels freighted annually. Small craft, from different parts of the Archipelago, occasionally visit the Piræeus and the neighbouring coast for wood. The shops maintain an insignificant traffic in furs and cloth. The best blue cloth in Athens was of bad German manufacture, selling under the name of English. Indeed, in almost all the towns of Europe, when any thing is offered for sale of better manufacture than usual, it is either English, or said to be English, in order to enhance its price.

Among the few articles of Athenian cutlery to be met with in the market, we found some small knives and forks, with white bone handles, inscribed with mottos in modern Greek, characteristic of the manners and sentiments of the people. For the rest, nothing can be more wretchedly supplied than Athens with the most common articles of use or convenience. The artists employed for the British ambassador were under the necessity of sending to Smyrna to obtain a wheeled cart for moving the marbles to the Piræeus, and for all the materials and implements wanted in preparing cases to contain them. No ladders could be found, nor any instruments proper for making them. It was not possible to procure the most ordinary domestic utensils, nor a single article of curriery.

Characteristic features of Grecian Cities.—Athens, Argos, Nauplia, Corinth, and many more, had each their lofty citadel, with its dependent burgh and fertile plain: in this they resembled each other; but in certain characteristics they all differ. Athens appears as a forsaken habitation of holiness: for a moment, unmindful of the degrading character of its divinities, the spectator views, with a degree of awe, its elevated shrines, surrounded on every side by a mountain barrier, inclosing the whole district as within one consecrated Peribolus. Argos, with less of a

priestly character, but equal in dignity, sits enthroned as the mistress of the seas: facing the sun's most powerful beams, she spreads her flowery terraces, on either side, before the lucid bosom of the waters, in regal majesty. Nauplia, stretching out upon a narrow tongue of land, and commanded by impregnable heights, rich in the possession of her port, "the most secure and best defended in the Morea," but depending always upon Argos for supplies, was fitted, by every circumstance of natural form, to become a mercantile city, and the mart of Grecian commerce. Corinth, the Gibraltar of the Peloponnesus, by its very nature a fortress, is marked by every facility that may conduce to military operations, or render it conspicuous for its warlike aspect. In every part of Greece there is something naturally appropriate to the genius and the history of the place; as in the bubbling fountains and groves of Epidauria, sacred to Æsculapius; the pastoral scenes of Arcadia, dedicated to the Muses and to Pan; the hollow rocks of Phocis, echoing to Pythian oracles; and perhaps the custom of making offerings to all the gods, upon the summits of Olympus and Parnassus, did not so much originate in any Eastern pratice, as in the peculiar facility wherewith the eye commanded from those eminences almost every seat of sanctity in Greece.

In various parts of Greece, where the labours of man have been swept away,—where time, barbarians, nay, even earthquakes, and every other moral and physical revolution, have done their work, an eternal city seems still to survive; because the acropolis, the stadium, the theatre, the sepulchres, the shrines, and the votive receptacles, are so many "sure and firm-set" rocks; slightly modified indeed by the hand of man, but upon which the blast of desolation passes like the breath of a zephyr. Argos is conspicuous in this class of cities; and if, in the approach to it from Tiryns, where Art seems to have rivalled Nature in the eternity of her existence, the view be directed towards the sea, a similar and not less striking object is presented in the everlasting citadel of Nauplia.

View of Athens at Sun-set.—As the hills opened at the other extremity towards sun-set, such a prospect of Athens and the Athenian Plain, with all the surrounding scenery, burst upon our view, as never has been, nor can be de-

scribed. It presented from the mouth or gap, facing the city, which divides Corydallus upon the south, now called the Laurel Mountain, from Ægaleon, a projecting part of Mount Parnes upon the north, immediately before descending into the extensive olive plantations which cover all this side of the plain, upon the banks of the Cephissus. There is no spot whence Athens may be seen that can compare with this point of view; and if, after visiting the city, any one should leave it without coming to this eminence to enjoy the prospect here afforded, he will have formed a very inadequate conception of its unspeakable grandeur; for all that nature and art, by every marvellous combination of vast and splendid objects, can possibly exhibit, aided by the most surprising effect of colour, light, and shade, is here presented to the spectator. The wretched representations made of the scenes in Greece, even by the best designs yet published in books of travels, have often been a subject of regret among those who have witnessed its extraordinary beauties; and, in the list of them, perhaps few may be considered as inferior to the numerous delineations which have appeared of this extraordinary city. But, with such a spectacle before his eyes as this now alluded to, how deeply does the traveller deplore, that the impression is not only transitory as far as he is concerned in its enjoyment, but that it is utterly incapable of being transmitted to the minds of others.—DR. CLARKE'S *Travels.*

SUBTERRANEOUS HOUSE, IN THE ISLAND OF ST. KILDA.

ON the peninsula, which terminates the larger bay on the south side, and which, at high water, is surrounded by the sea, and in every respect an island, is situated an old ruinous fort, called by the natives Dun-Jir-Bholg.

The stones of which this strange fabric was constructed, are large, nearly square, and must of consequence have been wrought out of a quarry: there being none of the same colour or substance to be found in the island, above ground. It is plain that those who laid them together,

understood the rules of masonry much better than the St. Kildians of this age, and they must have been undoubtedly men of greater power.

The greatest artificial curiosity is a house built under ground at Boreray; and another fabric which resembles a Druidical place of worship.

At the distance of many ages back (the precise time cannot be ascertained,) a bold, public spirited, or self-interested person, whose name was Staller, or the man of the rocks, headed an insurrection, or rebelled against the governor or steward, and at the head of a party engaged in the same disloyal conspiracy (or rather struggle for liberty,) possessed himself of Soay, and maintained his post there for some time. Here he built a strange kind of habitation for himself and his accomplices. The story is of an ancient date, but is, by this extraordinary monument, in some degree authenticated.

The house is eighteen feet high, and its top lies almost level with the earth, by which it is surrounded; below, it is of a circular form, and all its parts are contrived so, that a single stone covers the top. If this stone is removed, the house has a sufficient vent. In the middle of the floor is a large hearth. Round the wall is a paved seat, on which sixteen persons may conveniently sit. Here are four beds roofed with strong flags or stone lintels, every one of which is capable enough to receive four men. To each of these beds is a seperate entry; the distances between these different openings, resembling in some degree so many pillars.

The rebel (or rather friend of liberty,) who made this artificial cave, had undoubtedly abundantly sufficient reasons to justify his taste of architecture; that he must have wanted timber to build in the common way is morally certain; it is equally so, that he must have been apprehensive the enemy would invade his little kingdom in the night time: to this we must add, that he and his associates were in danger of perishing by the winter colds. All these considerations must have induced him to bury himself and his companions in a secure retreat under ground.

TRIUMPHAL ARCHES.

In several cities of France we find the remains of triumphal arches, which it was the custom of the ancients to erect, not only to adorn a triumph on returning from a victorious expedition, but to preserve the memory of the conqueror to posterity. There is one of these at Rheims, in Champagne, consisting of three arches, with chamfered columns, and adorned with bas-reliefs. The middle arch, which is the largest, is 35 feet high, and 15 wide, having on it the figure of a woman, with two cornucopias in her arms, which perhaps were intended to denote the fruitfulness of the country; four children about her express the four seasons of the year; and the twelve months are represented by so many statues. On one of the side arches is the story of Romulus and Remus sucking the wolf, attended by the shepherd Faustulus and his wife Acca Laurentia; and on the other arch is Leda embracing Jupiter transformed into a swan, and a Cupid lighting them with a flambeau.—One of the present gates of the city of Orange was a triumphal arch, erected by C. Marius, on account of a victory obtained over the Cimbri and Teutones, who made an inroad into Italy. Here are also the ruins of a Roman circus, and various other remains of antiquity.

ANTIQUITIES IN ENGLAND.

LONDON-STONE.

One of the most remarkable pieces of antiquity in London, is a large stone, now enclosed in a stone-case, on the north side of Cannon-street, and called London-stone. It was formerly fixed in the ground on the opposite side of the street, and secured with iron bars. This stone has been carefully preserved from age to age, and is mentioned by the name of London-stone so early as the time of Ethelstan, king of the West Saxons. The original cause of its erection has never been ascertained, but it is highly probable, that as London was a Roman city, this stone might serve as a standard from which the number

of miles were computed to other cities and stations in the province.—SMITH's *Wonders.*

THE HURLERS.

NEAR Bodmin in Cornwall, on a down, are a number of large stones in three circles, called the hurlers. They are oblong, rough, and unhewn; and take their name from a superstitious opinion of the vulgar, that they were men transformed into stones for profaning the Sabbath, by hurling the ball, an exercise for which the people of that country are particularly famous. Some take them for trophies erected in memory of a battle; others for boundaries to distinguish lands; and others, with more probability, for sepulchral monuments. Dr. Stukely, however, supposes them to have been a temple of the Druids, as well as Stonehenge on Salisbury Plain.—SMITH's *Wonders.*

THE PICTS' WALL.

THE principal remain of Roman antiquity in Great Britain is a wall, which runs the whole breadth of the island, through the counties of Cumberland and Northumberland, and extends above 80 miles from Solway Frith on the west, to the German ocean at the mouth of the Tyne on the east. The Romans, who built it as a barrier against the hostile incursions of the North Britons, called it Vallum Barbaricum, but in later ages it has been generally called "the Picts' wall."

The emperor Adrian first threw up a wall of earth, strengthened with large stakes driven into the ground, and wreathed together with wattles. This was repaired by Severus, in the year 123, and several stone fortresses or turrets were added to it, that an alarm might be given from one to another by the sound of a trumpet. The famous general Ætius rebuilt it with stone about the year 430, but it was soon ruined by the Picts, and no longer regarded but as a boundary between the two nations.

The remains of this wall may be easily traced, though

in most places the foundation only is discernible, with the trench before it on the north, and some little towers or mile castles on the south; the greater part of the stones having been removed to build houses, or to make enclosures about the neighbouring grounds. About ten miles east of Carlisle, it runs up a high hill, and from thence to its crossing the river Irthing, it runs through a large waste, where it remains entire, to the height of about five or six feet. From Thirlewall castle, not far eastward of the Irthing, the wall is continued over a range of steep and rugged rocks, that extends about nine miles. The highest part of it now standing between Carlisle and Newcastle is about half a mile from Thirlewall Bankhead, where it is nine feet high; and at this place are some vestiges of a Roman city surrounded by a deep trench. At Seavenshale, on the north side of the wall, are still to be seen the ruins of a Roman castle, curiously vaulted underneath; at Carrow-brough, about a mile and a half distant, are several traces of another ancient city; and at Postgate is a square Roman tower, now converted to a dwelling-house.

Before the wall on the north, is a deep broad ditch, except between Thirlewall Bankhead, and Seavenshale, where it is sufficiently secured by the steepness of the rocks on which it is built. The ditch is in most places 36 feet broad, and five feet deep; and a military stone causeway seems to have run at 20 or 30 yards' distance on the south side, which, between Postgate and Carrow, is but little decayed.

In the Picts' wall have been found, upon various occasions, pieces of tubes or pipes, which are supposed to have been artfully laid in the wall, between each turret, for giving notice of the approach of an enemy; so that any important intelligence could be communicated from sea to sea in the space of an hour. Here also have been found many coins, altars, and statues; and among the rest a brazen image about six inches long, supposed to have been the statue of the god Terminus, which the Romans used to lay in the foundation of their boundaries. SMITH'S *Wonders.*

STONEHENGE.

Of those remains of antiquity, found in Great Britain, which are not generally ascribed to the Romans, the most curious is a pile of large stones on Salisbury Plain, about six miles from the city of Salisbury, called Stonehenge, the origin, structure, and use of which have occasioned many disputes among the learned.

The name Stonehenge, which is purely Saxon, and signifies nothing more than *hanging stones*, probably alludes to the disposition of several parts of this wonderful fabric: but some authors have supposed the true name to be Stonehengist, and thence imagined this structure to have been erected in memory of Hengist the famous Saxon general; others have asserted that it is the tomb of Ambrosius Aurelianus, king of the Britons; and others have declared that it was raised by Ambrosius in memory of those Britons who were slain near this place by Hengist the Saxon. Some ingenious arguments have also been used to prove it a temple of the Tuscan order, built by the Romans; but most antiquaries have now agreed in the opinion of Dr. Stukely, that it was a temple of the British Druids. We shall therefore borrow a short account of it from the doctor's learned dissertation on this subject.

Stonehenge is situated on a rising ground, and makes a grand and awful appearance, especially as we approach it on the north-east, which side remains most perfect. It is encompassed by a circular ditch or trench, which having passed, we ascend 35 yards before we come at the work itself. The whole consists of four circles of stones, or rather two circles and two ovals, the outermost being about 108 feet in diameter. Of the outer circle, which originally consisted of 60 stones, that is, 30 uprights and 30 imposts, there are seventeen uprights left standing, six of which have imposts upon them, and two more are still to be seen lying upon the ground, and also six more uprights. These stones are of a vast bulk, the uprights being fifteen feet high, exclusive of the imposts. The inner circle, which is about eight feet distant from the first, consisted of 40 lesser stones which never had any imposts. They are flat parallelograms, like those of the outer circle; and

nineteen of them are yet standing. They are about 20 inches thick, and four feet high, being just half as big as the uprights of the outer circle. The walk between these two circles, which is 100 yards in circumference, must have been very delightful when this wonderful structure was entire.

Within these circles are the two ovals, which are the principal part of the work, here being the adytum, or cell, into which we may suppose none but the higher order of Druids were to enter. This is composed of what the doctor calls trilithons, each of which consists of two upright stones, supporting another laid across their heads and joined by mortises. Of these there are five remaining, three of which are entire, and two ruined in some measure, but the stones are still upon the spot. From the entrance into the adytum, these trilithons are placed two and two on each side, and one at the upper end, which was the highest, as the two first on the right and left were the lowest; but all the stones are of a surprising magnitude. The first trilithon on the right has suffered much, its impost and one of the uprights being tumbled down, and each broken into three pieces. The opposite trilithon on the left hand is standing, but very much decayed; the next to it is entire, as is likewise that facing it on the right, except that one end of the impost is fallen off, and its upper part is much impaired by the weather. The trilithon at the upper end, which stood beyond the altar, was the finest part of the whole work, the uprights having been above ten yards long, well chiselled, and justly proportioned in their dimensions. One of them stands entire, but leans against one of the stones of the inner oval; the other is broken asunder, and lies upon the altar, as does also the huge impost it once supported. This broken stone weighs above forty tons, and would require a hundred and forty oxen to draw it, and yet it is not the heaviest in the pile. It is therefore amazing, not only how such massy loads were brought hither, from the distance of 15 or 16 miles, but to see so many of them placed together in a nice and critical figure, artfully joined by tenons and mortises, and a geometrical proportion observed through the whole structure. How the builders could move such prodigious stones as these, which they have fixed as it were in sockets dug in the

chalk, and rammed in like posts, without more irregularity, in their height and distance, is altogether inexplicable.

The inner oval consists of smaller stones, which rose gradually in height from the entrance to the upper end of the adytum. There are only six of these remaining upright, with the stumps of three or four more, and several lying on the ground. The stone which our author supposes to have been the altar, is of a different kind from the rest, resembling the blue coarse marble, brought from Derbyshire, and frequently used for tomb-stones. It is 20 inches thick, and about twice as broad; but its length is not easily ascertained, it being broken into several pieces, and almost sunk into the ground by the weight of the ruins falling upon it, particularly the impost, and one of the uprights of the great trilithon above-mentioned. The heads of oxen, deer, and other beasts, the undoubted relics of sacrifices, which have been found upon digging in and about this place, are a confirmation that Stonehenge was originally a Pagan temple.

All the rising grounds about Stonehenge, for several miles, are covered with barrows, [or monuments of earth, thrown up in the form of a bell, and surrounded with little ditches, from which circumstance some have concluded, that great battles have been fought upon the plain, and that the bodies of the slain were there interred; but it is more reasonable to suppose, that they are no other than family burying-places, which are situated near this temple, for the same reason that the moderns bury in churchyards and consecrated ground: for it is observable, that all the barrows, even those at the greatest distance, are within view of Stonehenge.

In the year 1722, a barrow was opened, in the presence of Lord Pembroke, and in the centre of it, about three feet under the surface, was found a perfect skeleton, the head lying north towards Stonehenge. The year following, by his lordship's order, Dr. Stukely opened another, and found an urn of unbaked clay, containing a heap of burnt bones, intermixed with beads of various shapes and colours. A collar-bone, and one side of an under-jaw remained very entire; from the size of which, and from the female trinkets deposited in the urn, it was conjectured to have been a young woman of fourteen or fifteen years of

age, who had carried arms, as the British virgins used to do, the brass head of her javelin being found amongst the remains. In other barrows were found human bones, together with those of horses, deer, dogs, and other animals.

Dr. Stukely supposes, that Stonehenge was built soon after Cambyses invaded Egypt, and by his outrages forced the priests and inhabitants in general to disperse themselves into all parts of the world. Some of these, he imagines, came into Britain, and introduced part of their learning, arts, and religion, among the Druids, and probably had a hand in this very fabric, the stones being wrought with a tool; whereas all the other works of the Druids consisted of rude stones, after the patriarchal and Jewish mode. At that time the Phœnician trade was at its height, whose vessels might convey the Egyptians to this island; which makes our author's conjecture the more probable. What might possibly have cleared up these uncertainties, was a tablet of tin, with an inscription upon it, found at Stonehenge, in the reign of King Henry VIII.; but as the characters were not understood by the persons consulted on that occasion, the plate was either destroyed or lost.—Smith's *Wonders.*

GIANT'S CAUSEWAY, IRELAND.

Under this article, it may be proper to mention a curiosity in Ireland, about eight miles from Colerain, which has obtained the name of the Giant's Causeway, though it is evidently the work of nature. It consists of many thousand pillars, most of them standing perpendicular to the plane of the horizon, and very close to each other. Most of them have five sides, some six, and others seven, and yet their contexture is so adapted, that there is no vacuity between them. They are from 15 to 24 inches in diameter, and are composed of several joints or pieces of different lengths, the convex end of one being exactly fitted to the concavity of another. The sides of the pillars, which touch each other, are of a whitish freestone colour, but upon breaking of some pieces, the inside appears like dark marble, resembling that which the an-

cients called basaltes, This causeway runs from the bottom of a precipice into the northern ocean, how far is not known; but at low water it is visible at least 600 feet in length, the breadth, in the widest place, being about 240 feet, and in the narrowest 120. In some parts it is 15 or 20 feet, in others 36, above the level of the strand.—SMITH'S *Wonders.*

OLD SARUM.

AMONG the antiquities of England, none deserve a particular description more than the once beautiful city of Old Sarum, which stands at the distance of one mile from Salisbury, and was formerly the see of a bishop. This city was perfectly round, and, when in its prosperity, together with its lofty castle, rising from the centre, must doubtless have exhibited a very magnificent appearance; the whole being built on a large hill, that commands a beautiful and extensive prospect, which, with immense labour, was reduced to an uniform circular figure. The city was nearly 2,000 feet in diameter, encompassed by a ditch of great depth, and two ramparts. On the inner rampart stood a wall, near 12 feet broad at its base, formed of flint and chalk, strongly cemented together, and cased with hewn stone-work, on which was a parapet with battlements quite round. Of this wall there are still large remains to be seen on the north-west side.

At a considerable distance on the summit of the hill, which was in the centre of the whole circumference, stood the castle or citadel, surrounded by a deep intrenchment, and a high rampart. The city was divided into equal parts, north and south; and near the middle of each division were the gates, which formed the two grand entrances, and were directly opposite to each other. Each of these gates had a tower over it, and before it, was a mole of great strength. Besides these, there were ten other towers, which extended at equal distances quite round the city; and opposite to them, in a straight line with the castle, were built the principal streets, intersected in the middle by a grand circular one that went quite round.

The area on which the city stood, thus surrounded with walls, ramparts, towers, and a deep intrenchment, was also, for its greater security, divided into nearly equal parts by other intrenchments and ramparts; by which means, if one part was taken, the other was still defensible; and if the whole of the outworks were in the hands of an enemy, the besieged might retire into the castle, whose walls, from the large fragments and foundations that are left, appear to have been impregnable. There seems to have been but one grand entrance into the castle, which was on the east, through a narrow gate of immense strength, from whence a double winding stair-case led to the top. There appears to have been five wells, designed to supply the garrison and the inhabitants in time of war, or in case of a siege; but these have been long filled up.

Whether Julius Cæsar pushed his conquest thus far, is controverted; but that Old Sarum was frequented by the Romans is most certain, from the coins of Constans, Magnentius, Constantine, and Crispus, often found there. Kenrick, the Saxon, after conquering the Britons, in the year 553, took possession of this place; and it was held by the West-Saxon kings, his descendants, till Egbert brought the whole heptarchy under his power. King Edgar, who was descended from him, called a great council or parliament here in 960; but in the year 1003, it was taken by King Swein, who having pillaged and burnt part of it, returned to his ships loaded with wealth. The ruin of this place may be dated from a quarrel which arose between the garrison and the clergy, in the reign of King Stephen. The ecclesiastics disdaining to submit to military control, concerted a removal of their cathedral to Salisbury: this plan was carried into execution under the reign of Henry III., and in the time of Henry VII., Old Sarum was totally deserted.

Of the strength and splendour of this ancient fortress few vestiges remain, and the town is reduced to one solitary farm-house; which, however, still retains the enviable privilege of returning two members to parliament. —Smith's *Wonders.*

ANCIENT RELICS FOUND NEAR OXFORD.

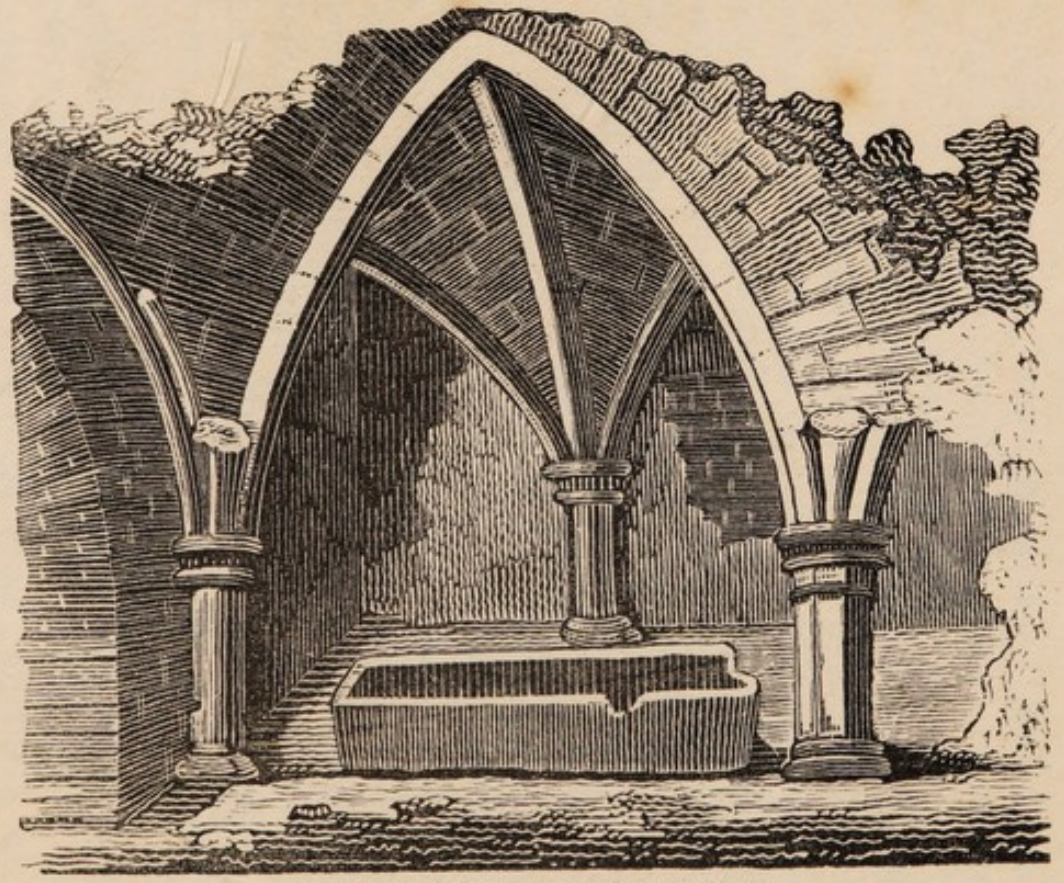
As some men were employed, on the 21st of November 1814, in digging a road from Burford, in the county o Oxford, to Banington, in Gloucestershire, about a mile distant from the former place, they discovered, six inche. beneath the surface of the earth, an immense stone coffin, lying north and south, which, after three successive days labour in clearing away the surrounding mould, was found to contain a perfect male skeleton of middle stature, having all the teeth entire. Unfortunately for the curious, the labourers (supposing it to be a treasure), in their haste to be satisfied, broke through the lid of the coffin, which was very closely fitted in a rabbet or groove with cement; and by their rude efforts, threw into confusion the bones of one, who it is not improbable had lain unmolested upwards of one thousand years. The coffin, in shape, differs from any I have ever seen or heard of, and weighs nearly three tons; it was with much difficulty moved to an aisle called Sylvester's, in Burford church. Its admeasurements are externally six feet seven inches in length, two feet nine inches depth at the head, two feet three inches depth at the foot, width very irregular. Internally it measures five feet eleven inches length, one foot nine inches depth at the head, one foot four inches depth at the foot. The lid, of the same shape as the coffin, is six inches thick, and dropt in a rabbet four inches deep, and one inch and a half wide. On examining the coffin, a number of short nails with conical heads were found, completely oxidated and matted together in pieces of hide; of which materials, from the circumstance of the nails being thickly placed and clenched through several layers of the hide, it is highly probable, a shield was formed. From the concurring testimony of the adjacent spot still bearing the name of Battle Ledge, and from the ancient custom of carrying about the town of Burford the figure of a dragon, on Midsummer-eve, it may not be deemed presumptuous, to fix the antiquity of the aforesaid coffin and its contents as early as the middle of the eighth century, when several of our historians record a battle to have been fought near Burford, between the Mercian King Ethelbald, and the West Saxon King Cuthred or Cuth-

bert, in consequence of the former's overbearing exactions on the latter, in which contest Ethelbald was subdued, and lost his banner, said to have borne the picture of a golden dragon.

ROMAN VILLA DISCOVERED IN OXFORDSHIRE.

Extract from a Letter, dated March 1818.

"A few days ago," says the writer, "I made an interesting excursion to the Roman Villa, which I discovered near Stonesfield, 11 miles from Oxford. It was first pointed out in 1816, by the Rev. Mr. Brown, the vicar of that parish. By the assistance of that gentleman, and of the Duke of Marlborough, on whose estate the Villa stands, extensive discoveries have been made. The building encloses about three acres of land; the peristyle, on every side of the quadrangle, is very evident, as are the divisions of forty-seven rooms. The pavements are tesselated, and in good condition. One of them in a large room, is perfect. The tesseræ are so exactly laid together, so beautifully varied, and the pattern so correct and elegant, that the best floor-cloth is not painted with more accuracy or beauty. The pattern is one which frequently appears on our modern floor-cloths. The baths are completely excavated, and the hypocausts and flues, by which they warmed their rooms, in the manner we have adopted for hot-houses, are apparent. The largest rooms seem to be about 30 by 25. One is exactly 28 by 24, a proportion in which the length exceeds the width much less than in modern rooms. Nothing has yet been found to fix the precise date of the villa; the coins collected, are those of Constantine the Great, who was Cæsar in 306, and Augustus from 307 to 308. The Duke of Marlborough shews a due regard to these valuable remains of antiquity. At present the remains of pillars, and the tesselated pavements are covered with mould, to protect them from frosts, which are particularly injurious to the latter, by loosening the tessuræ."



CEMETERY, ST. MARTIN'S-LE-GRAND.

DISCOVERY OF AN ANCIENT CEMETERY IN ST. MARTIN'S-LE-GRAND.

In the month of September 1818, as the workmen employed in clearing away the ground in St. Martin's-le-Grand, which is to form the site of the new Post-office, were removing the foundations of some of the old houses which stood in the rear of St. Leonard's Foster-lane, they discovered the roofs of some ancient vaults. This circumstance attracted attention, and care was very properly taken to clear away the rubbish, so as to afford an opportunity of examining these vestiges of ancient architecture. As soon as the rubbish on the particular spot was removed, three vaults were discovered, each communicating with the other by a narrow passage or gallery; they are built chiefly of large square bricks, intermixed with stone and some flint, and the interstices filled up with a yellow chalky earth. They are rather spacious, the height being nearly nine feet, the depth about eighteen, and the breadth about six or seven. They appear to have been each originally divided into two compartments. In the back part of one of the vaults was found a large quantity of human bones, thrown promiscuously together, as if collected from different graves. In one of them is a stone coffin, rather short in length, made in the shape of ancient coffins, square at the head, and inclining in a tapering form towards the feet; a place is rather rudely shaped for the head of the body to rest upon, and the remains of a skull and some decayed bones are in the cavity. Adjoining, and in the same line with these arches, is a vaulted roof, supported by a small and short stone shaft or pillars from which spring semicircular arches, intersecting each other at equidistant points, and presenting to the eye, the skeleton of a structure, at once simple, durable, and beautiful. The subdivisions of the intercolumniation were evidently open when built, and so arranged as to admit a communication with other parts of a building. The floor of these vaults is about 20 feet below the level of the pavement in Newgate-street; the loose ground, on the same level, bears all the appearance of having been once a cemetery, from the fragments and calcined parts of houses

intermixed with soft earth, which are observable in the vicinity.

St. Martin's-le-Grand was originally a college, founded in the year 700, by Wythred, King of Kent, and according to Dugdale, in his *Monasticon Anglicanum*, re-built and endowed by a noble Saxon, and his brother Edvardus, for a dean, and secular canons and priests, and was dedicated to St. Martin. The epithet Le-Grand was afterwards added, on account of the great and extraordinary privileges, particularly the dangerous one of Sanctuary, granted to it by different monarchs. William the Conqueror confirmed the endowments of this house, and the possession of the lands given by the founders, to which he added all the moor-land without Cripplegate, and exonerated its canons from all interference or exaction of any bishops, archdeacons, or their ministers. He likewise granted them *soc* and *toc*, *toll* and *team*, and a long *et cætera* of Saxon liberties in the most ample degree. His charter, sanctioned by John and Peter, two of the Pope's legates, concludes thus: "If any person whatever shall presume to alter any thing hereby granted, let him perish with Judas the traitor."

Henry III., had the weakness to confirm these mischievous charters, and to extend them in cases of debt, felony, and treason. The indulgence, granted was so obnoxious to the peaceable citizens, on account of the protection afforded to the lowest sort of rogues, ruffians, thieves, felons, and murderers, that they were frequently compelled to apply to the government for security against this sanctuary. Anciently, when this college was in a flourishing state, a curfew bell was rung here at eight o'clock every evening, and at St. Mary-le-Bow, St. Giles Cripplegate, and at Allhallows Barking, to warn the people to keep within doors. Edward I., in consequence of the many mischiefs, murders, robberies, and beating down persons by certain hectors walking armed in the night, commanded that none should be so hardy as to be found wandering in the streets, after the bell had sounded in St. Martin's-le-Grand. The college was surrendered to King Edward VI., in 1548, and soon after, the church was pulled down, and many tenements erected on the site.

Such is the historical account of the ancient sanctuary,

or edifice, of which these vaults appear to have been a part. The vaults, in which the bones are found, do not seem to be of very ancient date, they were probably formed by Edward VI., for the pious purpose of depositing therein the bones which were exposed at the demolition of the old church. The fine arched vault, supported by columns, which we have described, is evidently not of earlier date than the reign of Henry III. At that period the heavy form of the Saxon architecture gave place to a purer taste, and the broad circular arch and massive column, gave place to the pointed arch and slender pillar. The remains which we have described are in the pure style of this reformed taste, and before its simplicity was compelled by fashion to yield to the indiscriminate patch-work carving, that we find in the tracery and foliage of the architecture at the close of the reign of Henry III., and in subsequent times. The antiquary, whose research is bounded by the discovery of the sacred dust of a mouldering heap, may perhaps derive ample satisfaction from the vaults containing the bones of the dead; but the artist and lover of taste, will, we imagine, feel his attention alone drawn to the architectural fragment we have alluded to.

There are, we believe, very extensive vaults under parts of Newgate-street, many of them used as cellars by the inhabitants; and walled up for their particular convenience. It would perhaps be worth inquiry to ascertain their extent, particularly as we have heard that they appear to be connected with these ruins. The investigation might lead to some curious discoveries respecting the antique buildings of the metropolis, the description of many of which rests on conjecture and fable. From Aldersgate to the Old Bailey was once a line of the residences of our gentry, and these excavations are exactly in this track.

HAMMERSMITH GRAND SUSPENSION BRIDGE

The project for building the very handsome structure which we now see accomplished, was carried into effect under the provisions of an Act of Parliament passed in 1824. The company undertook to raise £80,000 by the sale of shares, and to erect the bridge in three years. Having purchased the Barnes Elms estate on the Surrey side, and the ground between the bridge and the Broadway, Hammersmith, they proceeded with their undertaking. The first stone of the north pier was laid by his royal highness the duke of Sussex, and the completion of the bridge alone cost about £45,000.

It is built upon the principle common to all suspension or chain bridges, and is considered superior to the suspension bridges in the north. The chain pier at Brighton is built on the same principle, but cannot be compared with this bridge in solidity.

The bridge is formed by piers on shore, and two stone towers rising from the bed of the river. The chains, suspended from the towers, and secured to the piers, suppor the road-way, running through arches in the towers fourteen feet wide.

There are eight chains composed of wrought iron bars, five inches deep, and one inch thick each; four of these chains have six bars in each chain, and four have only three bars in each chain, making in the total thirty-six chains, which make a dip or curvature in the centre of about twenty-nine feet; from these vertical rods are suspended, supporting the road-way, which is formed of strong timbers covered with granite: the width of the carriage-way is twenty feet, with two foot-ways on each side of five feet wide each. The suspension towers are built of stone, and designed as archways of the Tuscan order, and the part below the road-way to low water is boldly rusticated. The approaches on both sides are provided with octagonal lodges, with appropriate lamps and parapet walls, terminating with stone pillars surmounted with an ornamental cap.

ANCIENT SHIPS OF WAR.

Many ships that were formerly built exceeded in

magnitude those of our days. We read of some ships, built by the ancients, whose magnitude far exceeded the largest of the present times. That of Ptolemy Philopater was 280 cubits long, 38 broad, and 48 high; carrying 400 rowers, the same number of sailors, and 3,000 soldiers. But that which Hiero built, under the direction of Archimedes, was still more stupendous, having wood enough in it to make 50 galleys; together with a variety of apartments, galleries, gardens, baths, fish-ponds, mills, stables, &c. It was encompassed with an iron rampart, and had eight towers with walls and bulwarks, furnished with machines of war, particularly one that threw a stone of three hundred weight, or a dart twelve cubits long, to the distance of half a mile.—SMITH'S *Wonders.*

BAMBOO JACKETS FOR SWIMMING, *&c.*

THE Chinese are said to have contrived habits of bamboo, by which a person, unacquainted with the art or swimming, may easily keep himself above water. The following account of them is taken from a *Letter to the Author of the Seaman's Preservative*:—In the year 1730, I was passenger in a ship from Batavia to China, burden about 400 tons, called the Pridae, Francisco Xavir commander, freighted by English, Chinese, and Portuguese. Near the coast of China we met with a storm, which carried away all our masts, bowsprit, and rudder; and in our hold we had six feet of water, expecting every moment that the ship would founder. We consequently were consulting our preservation: the English and Portuguese stood in their shirts only, ready to be thrown off; but the Chinese merchants came upon deck, not in a cork jacket, but I will call it a *bamboo habit,* which had lain ready in their chests against such dangers; and it was thus constructed: four bamboos, two behind and two before, were placed horizontally, and projected about 28 inches. These were crossed on each side by two others, and the whole properly secured, leaving a space for the body; so that the wearer had only to put it over his head, and tie it securely, which was done in two minutes; and

we were fully satisfied that the persons thus equipped could not possibly sink.

LARGEST BELL IN EUROPE.

The great bell at Erfurt is reckoned the largest in Europe, weighing upwards of twelve tons, being near 11 feet in height, and about as many yards in circumference. We are told the sound of this bell may be heard at the distance of 24 miles, which does not appear utterly improbable*.

BRASS MORTAR, TEN FEET IN LENGTH.

On the ramparts of Brunswick is a curious brass mortar-piece, (made in 1411,) which measures 10 feet in length, and 9 in diameter. It requires fifty-two pounds of gunpowder to charge it; and will throw a bomb of one thousand pounds' weight. It is also asserted that this extraordinary piece will carry a ball of seven hundred and thirty pounds' weight to the distance of thirty-two thousand paces.—Smith's *Wonders.*

MOUNTAIN OF SLEDGES.

The Mountain of Sledges, or the flying mountain, in Russia, is one of the most curious and extraordinary buildings in the gardens of Peterhoff. In the middle of an oblong area, enclosed by an open colonnade about half a mile in circumference, stands this flying mountain, ex-

* It may perhaps seem strange to some readers that the sound of bells which hang in plains and valleys may be heard farther than those which are placed upon hills; but the reason of this will be understood by considering, that as air is the medium of sound, the higher the sonorous body is placed, the more rarefied is that medium, and consequently the less proper vehicle to convey the sound to a distance. We may also observe, that the sound of a bell struck under water is a fourth deeper than in the air, as has been found by experiment; though Mersenne says it is of the same tone in both elements.

tending nearly from one end to the other. It is a wooden building, supported by pillars, and represents a mountain composed of three principal ascents, gradually diminishing in height, with an intermediate space to resemble valleys; and from top to bottom is a floored way, in which three parallel grooves are formed. The mode of using it is as follows:—A small carriage, containing one person, being placed in the centre groove upon the highest point, goes with great rapidity down one hill; the velocity which it acquires in its descent carries it up a second, and it continues to move in a similar manner until it arrives at the bottom of the area, where it rolls for some time on the level surface, and stops before it reaches the boundary. It is then placed in one of the side grooves, and drawn up by means of a cord fixed to a windlass.

At the top of the mountain is an apartment for the accommodation of the court and principal nobility; and several thousand spectators may also be accommodated within the colonnade and upon its roof.

WONDERFUL ROAD.

Among other grand works, Peter I. caused a road to be cut from Petersburgh, that was to extend 734 wersts, or 487 English miles, in a direct line. Vast forests of fir, birch, and other trees, were cut through, and a passage made through morasses, till then thought impassable. Immense quantities of timber were hewn down, ditches were made, and the earth being thrown up and levelled, straight firs, with their surfaces made plain, were laid close to each other upon it. These were supported by a foundation of the same kind of timber, composed of a row of trees, on each side secured by cross timbers. This road of timber was carried according as the land required for about 150 wersts, and, as Mr. Hanway calculated, contained two millions and one hundred thousand trees.—Smith's *Wonders.*

SLATE QUARRIES, LONGSLEDDALE, WESTMORELAND.

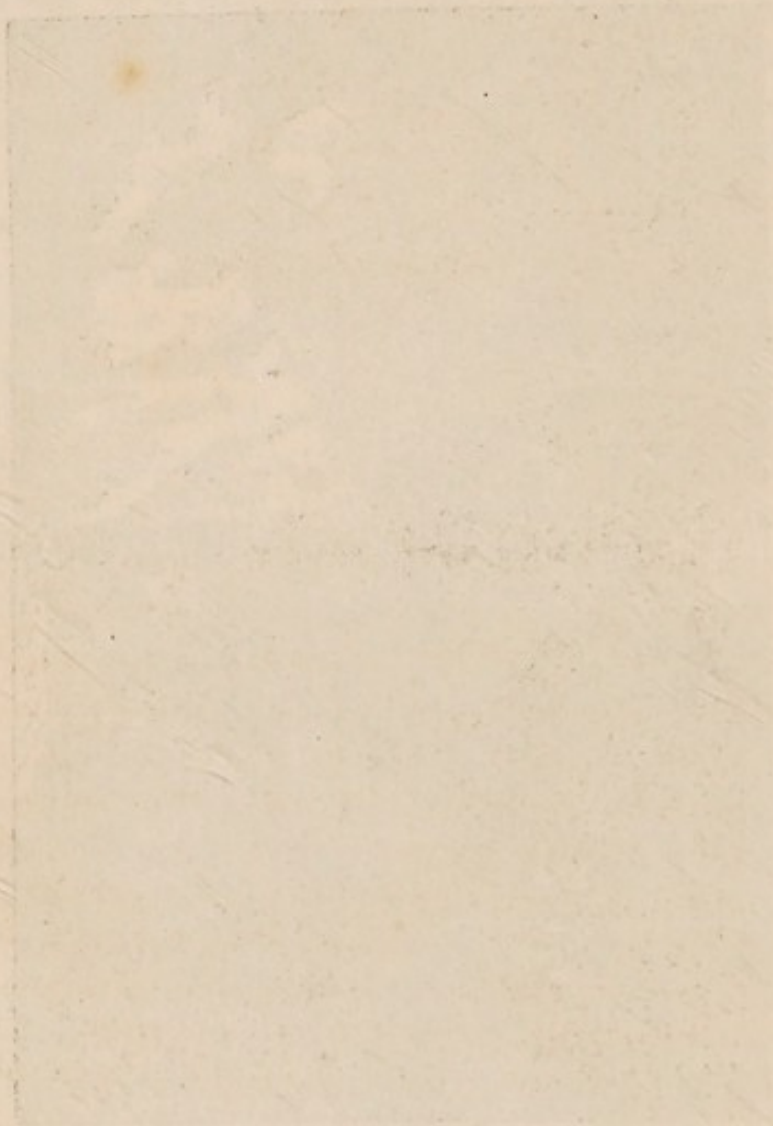
There are few places in Great Britain, where slate is worked *as a mine under ground*—most of the quarries are open to the day; and the covering of other rocks, or of coarse slate, which requires removing, greatly increases the expense.

The slate in Westmoreland is blasted from the quarry in large masses, and split, with proper tools, by the workmen. Many of these quarries are of great depth, and the rude and grotesque appearance of the residual clefts, the activity of the workmen on the different ledges of rock, the noise arising from disrupturing the strata by blasting, and separating and shaping of the different laminæ, altogether form a most interesting scene. In some parts of Westmoreland the slates are conveyed from the quarries on the backs of small mountain-horses, and then placed in waggons: by the introduction of iron rail-ways, however, two or three waggon loads of slates (the vehicles being chained together) are now drawn by a single horse.

LARGE WINE-VATS

Several towns in Germany are noted for tuns or wine-vats of an uncommon size; but that of Heidelberg, which stands in a vast cellar under the Elector's castle, is of all others the most celebrated. The first we hear of was large enough to contain 528 hogsheads of wine, but this was re-built in 1664, and made to hold 600 hogsheads English measure. The old one had iron hoops each weighing above one thousand two hundred pounds; but the new one was girt about with very strong ones of knee-timber, adorned with paintings and inscriptions, and supported by carved pedestals. There was also a stair-case, of 43 steps, which led to the top of it, where the electors themselves have had frequent carousals. It is said, this prodigious vessel was emptied and broken to

SLATE QUARRIES, LONGSLEDDALE.



pieces by the French in 1668, but that another was afterwards made of a larger bulk.

The tun of Konigstein, built by order of General Kyaw, is, however, still larger, its length being 17 Dresden ells, and its diameter at the bung 12 ells. It consists of 157 staves, 8 inches thick, and 54 boards for the heads. It holds 3,709 hogsheads of wine · and upon one head is a Latin inscription. The top of the cask is railed in, and affords room for fifteen or twenty people to regale themselves.—SMITH'S *Wonders.*

PRECIOUS STONES.

DIAMONDS.

THE diamond, in its most perfect state, is clear and pellucid as the purest water, and is eminently distinguished from all other substances by its vivid splendour and the brightness of its reflections. However, it is sometimes found tinged with a yellow, blue, red, or greenish cast, by the accidental mixture of some metalline particles: but the tinges are usually slight; and in these states it is extremely different from other gems of those colours, being of infinitely greater lustre. The diamond is found of various sizes, but generally small, the large ones being very seldom to be met with; and, as its size is uncertain and irregular, its shape is much more so. But its varieties of figure are never found to affect the internal structure of the body, which, from a minute examination with a microscope, appears to consist of several parallel plates or tables extremely thin, and laid over one another with the utmost regularity.

Diamonds are found chiefly in the kingdoms of Golconda, Visapour, Bengal, and the island of Borneo. The mines are generally adjacent to rocky hills and mountains,

and sometimes the diamonds are found scattered in the earth, within two or three fathoms of the surface. In other places, the miners dig through rocks to the depth of 40 or 50 fathoms, till they come to a sort of mineral earth in which they find the diamonds enclosed. This earth is sometimes of a yellowish, and sometimes of a reddish colour, and adheres to the stone so strongly, that it is difficult to get it off. A sufficient quantity of this earth being dug out of the mine, it is thrown into a cistern of water, where, having soaked for some time, it is stirred about till the clods are broken, and the gravelly matter sinks to the bottom. After this a vent is opened, and the cistern supplied with clean water, till all the earthy substance be washed away, and nothing but gravel remains. What thus settles at the bottom is spread to dry in the sun, then sifted, and afterwards carefully searched with the hands to find out the diamonds, at which the workmen are so expert, that the most minute bit of a stone can hardly escape them. It sometimes happens, however, that the earth is so fixed about the diamonds, that, before they are rubbed on a rough stone with sand, their transparency cannot be discovered.

In the kingdom of Golconda, or in that of Visapour according to some maps, are the mines of Raolconda, which have been discovered above 200 years. The earth here is sandy, and full of rocks; and in these rocks are found several little veins, half an inch or an inch broad, out of which the miners, with hooked irons, draw the sand or earth that contains the diamonds, breaking the rock when the vein terminates, that the track may be easily found again and continued. To separate the diamonds from this earth, it undergoes several washings and other operations, as we have already observed. The miners are obliged to work almost naked, and have likewise inspectors to prevent their concealing the diamonds; which yet, notwithstanding all this care, they sometimes find opportunities of doing. Tavernier says, he saw one detected who had put a small stone into the corner of his eye; but swallowing a diamond is a surer and more usual method amongst them. If the miners meet with a stone of 15 or 16 carats, they are allowed a reward, be-

sides their usual pay, which is very little. The king has two per cent for all the diamonds that are sold; and also a duty from the merchants, according to the number of hands employed in digging.

There are other mines at Gani, or Coulour, in the kingdom of Golconda, where they find diamonds from ten to forty carats and upwards; but these are not very clear, their water being usually tinged with the colour of the soil, which in some places is yellowish, in others black and moist, and in others reddish. Another defect of some consequence is a kind of greasiness appearing on the diamond when cut, which takes off part of its lustre. Here the miners generally dig to the depth of 12 feet, or till they find water, which prevents their going farther. The earth is carried from the mine by women and children into a neighbouring enclosure, where it is washed and then dried and sifted. According to Tavernier, there are generally 60,000 persons, (men, women, and children,) employed in these mines of Coulour; they work almost naked like the miners of Raolconda, and are watched in the same manner by inspectors.

A great number of diamonds are found near Soumelpour, a large town in Bengal, situated on the river Goual. From this river all our fine diamond-points or sparks, called natural sparks, are brought, where they search for them after the great rains are over—that is, after the month of December. At that season, when the water is clear, eight or ten thousand persons, of all ages, come out of Soumelpour and the neighbouring villages, and examine the sand of the river, going up it to the very mountain from whence it springs. After this examination, they proceed to take up the sand wherein they judge diamonds are likely to be found; and this is performed in the following manner:—Having made a dam round the place with earth, stones, fascines, &c., the river being then very low, they lade out the water, and dig about two feet deep, carrying the sand into a place walled round on the bank of the river, where the process is much the same as at the mines above-mentioned, and the workmen are watched with equal-strictness. As to the diamonds of the island of Borneo, they are found in the sand of the river Succadan, or Succadano, and perhaps in some

other parts of the island, with which we are little acquainted.

To bring diamonds to that perfection in which their beauty consists, the diamond-cutters begin by rubbing two rough diamonds against each other, after having well cemented them to the ends of two blocks, called cutting-sticks, thick enough to be held in the hand. By this means they rub off the dull outer crust, and reduce them to form, in order to their being polished; and this powder, thus rubbed off, and received in a little box, serves to polish the stones. Diamonds are polished by means of a mill, which turns a wheel of cast iron, smeared with diamond-dust, mixed with oil of olives. This wheel moves horizontally; and before the diamonds are applied to it, they are soldered into pieces of metal prepared for that purpose. But diamonds are more expeditiously divided by finding the grain of the stone, as it is called; that is, the disposition of the laminæ or plates of which it is composed, and introducing between them the point of a fine chissel. When this is properly done, a stone will split as evenly as a piece of talc, and give two diamonds or more, if the thickness will allow it, of the same breadth or surface with the original one. The splitting a diamond sometimes answers another end, when the stone has a flaw or blemish in it, which greatly debases its value; for by separating the plates at a proper depth, the flaw may be removed.

Diamonds, besides being used as ornaments, are of great service to the glass-trade, for they alone will cut glass. Those used by the glaziers are set in an iron ferrule, about two inches long, fixed in a handle of box or ebony; and those used for cutting looking-glasses, &c., are called plough-diamonds, and are fitted into a kind of plane.—SMITH.

THE CARBUNCLE

THE carbuncle is a very beautiful gem, found only in the East Indies, and there but very rarely. Its colour is a deep red, resembling that of a ripe mulberry, and going off, where palest, into a strong scarlet; but when

held up against the sun it loses its deep tinge, and becomes exactly of the colour of burning charcoal, from whence it seems to have obtained its name. It is generally found pure and faultless, and is naturally of an angular figure, smaller at one end than the other, which end tapers to a point like a pyramid, and is more finely coloured than the lower part of the column. It is of the same degree of hardness with the sapphire, which is second only to the diamond; and it bears the fire, without either losing its colour, or even becoming paler for the trial. This has been experienced by some of our jewellers, who, disliking its deep colour, have endeavoured to render it more vivid and striking to the eye, by divesting the gem of some part of it, but always without success. Many authors have confounded the carbuncle with the ruby, and determined that every ruby which exceeds twenty-four carats is properly a carbuncle; but the two gems are essentially different.

THE TOPAZ.

The topaz of the moderns, which is undoubtedly the chrysolite of the ancients, is a very beautiful and valuable gem in its purest and most perfect state; but such are rarely to be met with, and the less perfect ones are of little value. Those of the Indies are the finest in the world; but they are generally small, being seldom found bigger than the head of a large pin, though now and then one arrives at one-sixth of an inch in diameter. The form of the topaz is always that of a pebble, roundish or oblong, usually flatted on one side; and its surface is uneven, but considerably bright, and of a good natural polish, unless it have contracted some accidental foulness. The finest topazes are of a golden colour, but they vary from this up to the colour of the deepest saffron, and down to that of the palest amber. They have a lustre at least equal to any gem, except the diamond; and, being divested of their colour by fire, they resemble it very nearly: but the more common sort of topazes are dead and heavy. This gem may be easily counterfeited; and there are factitious ones, which, by the eye, can scarcely be distinguished

from those that are natural. Our jewellers, also, frequently call those topazes, which are only coloured crystals.—Tavernier mentions a topaz in the possession of the Great Mogul, weighing 157 carats, which cost £20,300. sterling, and is the finest gem of this kind ever known.—SMITH'S *Wonders.*

JASPER.

JASPER IS a precious stone, not much different from the agate, except that it is more opaque, softer, and does not take so good a polish. The florid jasper, found in the Pyrenees, is usually stained with various colours, though some have only one colour, as red or green; but these are least valued. The green, spotted with red, that which borders on a purple colour, or that of a carnation, is held in the highest estimation.

GARNET.

THE granate, or garnet, as it is commonly called, is a gem of a red colour, resembling that of the kernel of a pomegranate, from whence it derives its name. Granates are distinguished into oriental and occidental; the former are brought from several parts of the East Indies—the latter are found in Spain, Bohemia, and Silesia; of which last sort those of Bohemia are most valued, and sometimes preferred to the oriental kind.

THE OPAL.

THE opal, a gem of a very peculiar kind, and much valued in all ages, is likewise found in Arabia, and that in greater perfection than in Europe. It is softer than any other of the fine gems, and not easily polished; but, being naturally of a smooth surface and tolerable gloss, some of the best of them are worn with their native polish only. It is found of various sizes, but most frequently between that of a pea and a horse-bean; though sometimes

it is met with as small as the head of a pin, and sometimes as large as a walnut. Its shape is likewise uncertain, some being irregularly oblong, others perfectly round, and others in the form of a kidney. Its colour is of so mixed a nature, that it is not easy to be described, being something like the finest sort of mother-of-pearl, but far exceeding it in lustre and transparency.

As it is variously turned about, it shows the colours of almost all the other gems, having the yellow of the topaz, the blue of the sapphire, the green of the emerald, the red of the ruby, and the fire-colour of the carbuncle, when held against the sun. All these colours, besides a white milky cast, are of a fine brightness and lustre, but are only the effect of different reflections of light falling on it in different angles, and not permanent and unalterable in the stone, like the single colours of other gems; for the small fragments of opal do not show them, but are of a pale bluish or pearly grey, which is properly its genuine colour. Some opals want one or more of the above-mentioned colours, and are liable to be tinged with a deep bluish black; in which last case the gem shows no colour but its red in any light or position; but then the red appears remarkably glowing and fiery, and seems lodged very deep in the stone; so that in this state, which is but an imperfect one, it has an excellency beyond even its finest specimens.—SMITH'S *Wonders*.

GROWTH OF CORAL, *&c.*

FROM these productions of the land, we must now proceed to consider a marine vegetable, called coral, which grows plentifully in the Persian Gulf. The ancients supposed coral to be a stone, but most of the moderns rank it among the number of sea-plants; and this opinion is now so well established, that all others seem almost precluded. M. Tournefort maintains that it multiplies by seed, though neither its flower nor seed be known; but the Count de Marsigli has discovered some parts therein, which seem to serve the purpose of seeds and flowers. Allowing coral then to be a plant, it has, in that quality, a root, whereby

it is fastened to the rock on which it grows. These roots are covered with a bark full of starry pores, which traverse them from top to bottom. A little way from the root, the plant is divided into small branches, having white streaks, therein, which seem to represent a kind of fibres. The extremities of the branches are softish, and rounded intc little knobs, commonly divided into six cells, filled with a milky humour, sharp and astringent. And that nothing may be wanting to constitute a real plant, these round tumours are esteemed a kind of pods, containing the seed of the coral; for it is said, that wherever the enclosed juice happens to be shed, and meets with a hard body to fix on, it carries fecundity along with it, and produces a coral-plant; whence it is, that in the cabinets of the curious we find some of it on pieces of earthen-ware, shells, and other kinds of solid bodies, which chance has thrown in the way of the scattered seed. It seems a confirmation of this, that the foot, or root, of coral takes the exact form of the solid it grows to, and even covers it, like a plate, to a certain extent, which shows that it was originally a fluid substance; and we sometimes find the same substance lining the inside of a shell, which it could never have entered but in a fluid form.

Coral usually grows in caverns, or on the prominent parts of rocks at the bottom of the sea, but it vegetates the contrary way to all other plants, the root adhering to the top of the cavern, and the branches shooting downwards. Hence an objection naturally arises against the hypothesis that coral is propagated by seed; for as it grows with its head downwards, the seed, if it bears any, must, when come to maturity, fall to the bottom of the cavern. How comes it then, that this plant never grows at the bottom, where the seed falls, but always on the sides or tops of the clefts in rocks, whither it cannot be carried? To which it may be answered, that the seed of coral is probably so very fine as to be lighter than the water, in which it may likewise be buoyed up by the milky juice that surrounds it, which is of an unctuous nature. The consequence of this is, that those seeds which rise to the surface of the water, and there swim about at random, perish and come to nothing; whereas those which meet with crevices and vaults of rocks in their way, to fasten them

selves unto, unfold their tunicles, and flourish into a little tree.

Upon a strict examination of the several parts of coral, the Count de Marsigli concludes, that all its organism, with regard to vegetation, consists in its rind; that the tubules of this rind filtrate a juice which fills the little cells, and runs along the canals to the extremities of the branches; and that this juice being petrified, both in the cells encompassing the coralline substance, and in those of the ends of the branches, whose substance is not yet formed, makes the plant grow and increase in its dimensions.

There are three kinds of coral, white, red, and black, the first of which is rarest and most esteemed. The red was formerly used in medicine, but is now scarcely ever prescribed by any intelligent practitioner.

The time of the coral fishery, as it is called, is from April to July; and the principal places for it, besides the Persian Gulf, are the Red Sea, and some parts of the Mediterranean, both on the coasts of Africa and Europe. The method of fishing is nearly the same in all places, and is as follows. Seven or eight men go in a boat, to tear up the coral from the rocks, with a machine which is composed of two pieces of wood, crossing each other at right angles, with a leaden weight at the centre to sink them, and a strong net at each end to entangle the coral, besides a quantity of hemp loosely twisted. This is let down into the sea by a rope, and being moved along the sides of the rocks, the coral growing on the prominent parts is embarrassed amongst the nets and hemps, and is drawn up by the fishermen, who, by the sudden breaking of the rope, are sometimes in danger of drowning. Before the fishers go to sea, they agree for the price of the coral, which is sometimes more and sometimes less a pound; and they engage, on pain of corporeal punishment, to deliver the whole to the proprietors.—SMITH'S *Wonders.*

MINES

GOLD AND SILVER MINES.

Almost every part of South America affords mines of gold and silver, but those rich metals are most abundantly found in Chili and Peru, as well as large quantities of copper, tin, lead, and quicksilver. It is observed, that gold is most frequently found native of all metals, being rarely met with in a state of ore, and then intermixed with the ores of other metals; but, though native gold be free from the penetrating sulphur which reduce other metals to ores, it is very seldom found pure, but almost constantly a mixture of silver with it, and frequently of copper. If it have any considerable quantity of copper in it, it is easily discovered by its hardness; but the silver is not so readily detected. Sometimes native gold is found in the mines in pure masses, so large as to weigh twelve, fourteen, or sixteen ounces; but these are very rare. Its more common appearance in its loose state is in form of what is called gold-dust, that is, small particles mixed among the sand of rivers, which is very frequent in Guinea, as we have already observed, and many other parts of the world. But native gold is also found in a middle state, as to size, between the two kinds just mentioned, in the clefts or perpendicular fissures of the solid strata in the mountains of Chili. These fissures are usually filled with a reddish earth, the native gold being either loose amongst it, or immersed in a crystalline stone of a bluish hue, and generally in flattish pieces, from the size of a small pea to that of a horse-bean. When they have dug out this red marl, it is carried on mules to the lavaderos (as they call them) a sort of basins of water*, where it undergoes several re-

* These lavatories or basins, according to M. Frozier, are made somewhat in the form of a smith's bellows, into which a little rivulet of water runs with a great deal of rapidity, dissolving the parts of the earth, and carrying every thing away with it except the particles of gold, which by their weight precipitate to the bottom. Sometimes large pieces of gold are found in these lavatories, which

peated lotions in different waters, till the earthy and impure parts are all separated and carried away by the stream, and the gold left at the bottom.

In these forms gold frequently appears in those parts of the world where it abounds, but still the greatest quantities of it are found bedded in masses of hard stone, which lie at vast depths, being often dug at 150 fathoms. There is no peculiar stone in which it is immersed, but it is met with indiscriminately in several kinds, some softer, some harder, and even in earths. The richest masses are usually a whitish but opaque stone, which is a debased crystal, containing a great deal of white earth, often tinged likewise with black, and sometimes with other colours. In this stone the gold lies in a great variety of figures, sometimes like small branches, at other times interwoven in narrower or broader veins, or in little flat spangles intermixed with specks of black. But, besides this sort, there are many coarser stones in the mines of Peru, which contain considerable quantities of gold, visible in large or small spots; and these are of all colours, but generally white or reddish. In these stones the gold is commonly in small spangles.

In order to separate the gold when dug out of the mines, they first break the metalline stone or ore with iron mallets, and then carry it to the mills, where it is ground to a very fine powder, which is afterwards passed through several brass wire sieves, as fine as any we have made of silk. The powder thus prepared, is laid in wooden troughs, with a proper quantity of mercury and water, where it is worked together, and there left to saturate in the sun and air for forty-eight hours. During this time the mercury imbibes all the gold, without cohering with the coarser earth or sand, which upon inclining the trough, is easily washed away with the water. The mass which then remains concreted at the bottom is nothing but gold, mercury, and some fine earth, which last they disengage from the mass by repeated effusions of hot water, and the mercury they separate by distillation in large alembics.

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usually turn to very great profit when there is no want of water, the expenses of getting gold this way, being but trifling, compared with those accruing in the common method, by machines, fire, and quicksilver.

The gold in this state, though not yet perfectly pure, is called virgin gold, as well as that found in the sand of rivers, or that in grains in the mines, as none of them have passed the fire. After this, they usually fuse it in crucibles, and cast it into plates or ingots.

The next metal to gold in value is silver, and of this the mines of Peru, and some other parts of America, afford the greatest quantities of any in the world. This metal, as well as gold, is found native, more frequently than in a state of ore; what are commonly called silver ores, being no other than stones of various kinds, in which are bedded large quantities of native silver. Sometimes it is also contained in the softer fossils, as earths; and sometimes it is found loose among strata of sand. That which is lodged in stone, is usually disposed in flat masses variously streaked, ridged, and often resembling silver-lace; that in earths is frequently branched, and that among sand, in small roundish or oblong granules. However, though silver is often found thus native and pure, it is likewise frequently met with in a state of ore, and sometimes embodied in the ores of other metals.

The proper and peculiar ores of silver are also various in their appearance; but its most usual ore is of a singular and remarkable body, being naturally malleable. The colour of this is a blackish blue, and it so nearly resembles lead, that many have mistaken it for that metal in its native state. It is found in large irregular masses, sometimes of a laminated structure, extremely heavy, and very rich in metal, containing often three-fourths of pure silver; but among these are usually found some of a more debased nature, containing much less silver, and distinguished from the rest by their not being malleable, and of a paler colour.

Another appearance of silver in the state of ore is in brownish masses, obscurely transparent, and somewhat resembling the coarser sorts of amber. These are usually of an irregular shape, often in the form of common pebbles, but sometimes flatted, and with rugged edges. This sort of ore breaks with a slight blow, and is also very rich in silver, usually containing nearly two thirds of its weight in metal, But there is yet another appearance of silver-ore, superior to all other ores in beauty, being a

compact substance, of a regular texture, of a very bright red, a smooth even surface, and considerably pellucid. This very much resembles the native sandarach*, and is sometimes exactly of the fine florid red of that body, but more frequently approaches to a crimson.

These are the more usual appearances of silver in a state of ore, but it is found with numberless accidental variations; and there are stones of all colours and consistencies wrought in different places for the silver they contain. In the mines of Peru, some of the ores, as they are called, are grey, spotted with blue and red; others have various shades of red, with mixtures of yellow or brown; and others are black, green, or yellow. Some of these are of the nature of one or other of the ores above described, only debased by adventitious mixtures; the others are stones wherein native silver is lodged, which are commonly confounded with the rest, under the name of silver ores. The black ores are the richest and most easily wrought, and the silver they yield is of the best quality. The veins of silver are usually richer in the middle than towards the extremities; but the richest places are those which the veins intersect.

The most celebrated mines of Peru are those of Potosi, which have now been opened nearly 260 years, and yet continue to be wrought with equal advantage as when first discovered; only with this difference, that the veins, which were then almost on the surface of the mountain, are now sunk to prodigious depths, some of the pits or wells being 200 fathoms deep, and yet not incommoded with water. What renders the working of mines exceedingly dangerous is, the variety of exhalations arising from them, which are even felt on the outside, and affect animals that graze in the neighbourhood; but within they stupify the miners, none of whom can bear so noxious an air above a day together. Sometimes it is so fatal as to kill on the spot, and oblige them to stop up the veins from whence it exhales. The mines of Potosi are the least subject to

* This is a preparation of orpiment, and is the same with what is otherwise called red arsenic; but there is also a white gum named sandarach, obtained from the trunk and thick branches of the great juniper-tree, by incisions made in the heats of summer.

these vapours, and yet without the herb paraguay, the infusion whereof is drunk by the miners as we do tea, these mines must soon be abandoned. Some millions of Indians have perished in them, and prodigious numbers continue to be destroyed every year.

The mountain of Potosi, which is famous for the immense quantity of silver it has produced, was first discovered to contain that metal, by a mere accident. An Indian, named Gualca, pursuing some wild goats up this mountain, and coming to a very steep part, laid hold of a shrub, in order to ascend with the greater celerity; but, it being unable to support his weight, came up by the roots, and discovered a mass of fine silver, and at the same time he found some lumps of the same metal among the clods which adhered to the roots. The Indian, who lived at Porco, hasted home, washed the silver, and made use of it, repairing, when his stock was exhausted, to his perpetual fund. At length, an intimate friend, perceiving the happy change in his circumstances, eagerly inquired the cause; and repeated his questions with such earnestness, that Gualca, confiding in his friendship, revealed the secret. For some time they resorted to the mountain for fresh supplies, till, Gualca refusing to discover his method of purifying the metal, the other, in revenge, revealed the whole secret to his master, who went in April, 1545, to view this fortunate breach in the mountain; and the mine was instantly worked with immense advantage. The first mine had the name of the discoverer, from its occasioning the discovery of other sources of wealth enclosed in the bowels of the mountain: for, in a few days, another was found no less rich, and was named the Tin mine; afterwards another was found, and distinguished by the name of Rica, or Rich, as exceeding all the rest. At length another was discovered, which was called the Mendicta. These are the principal mines of this celebrated mountain; but there are several smaller, crossing it in all directions.

The importance of these discoveries induced people to flock to Potosi from all parts, particularly from the city of Plata, which stands about 75 miles from the mountain, whence the town of Potosi is at present near six miles in circuit, and inhabited by many noble families, particularly

those concerned in the mines. The air of the mountains is indeed so cold, as to render all the adjacent country remarkably barren; for it produces neither corn, fruit, nor herbs, and yet the town is so plentifully supplied, as to be in want of nothing, the trade for provisions being greater there than in any other place, Lima excepted. Some provinces send the best of their corn and fruit, others their cattle, others their manufactures; while others resort thither with European goods, as to a sure market. A Spanish author declares, on the best authority, that before the year 1638, it appeared, by the public accounts, that the silver produced by this mountain amounted to 395,619,000 dollars, which in ninety-three years, the time it had then been discovered, amounted to 41,245,043 dollars per annum. Hence an idea may be formed of the immense trade that has for many years been carried on in this town, which consists entirely of the silver extracted from this mountain, and is still very considerable, though some diminution has been perceived in its produce.

In the province of Carangas, which is remarkably cold, there are many silver mines constantly worked; among which, one called Turko, is remarkable for the ore named by miners Machecado, the fibres of the silver forming an admirable intermixture with the stones in which they are contained. Besides, in the barren, sandy deserts, extending towards the coast of the South sea, are found, by digging in the sand, detached lumps of silver, unmixed with any ore or stone, but what adheres to the metal, they having all the appearance of melted silver, with black terrene particles on the outside. The size and figure of these lumps are very different, some weighing about two marks, or sixteen ounces, and some above a hundred marks. These lumps of silver are found in different parts of the same ground, though seldom near each other.

The manner of separating silver from its ore is nearly the same as in gold. They break the ore in the stamping-mill till it is reduced to powder, and then mix it up with mercury into a sort of paste, which they knead in the troughs till the water has by degrees washed away all the earthy particles. After this they strain off part of the mercury from it through a woollen bag to serve again, and

the rest is made to evaporate by fire. The silver that remains behind is, last of all, perfectly refined from all heterogeneous matter by a solution of lead, which, exhaling from it, carries off in fumes the copper or other alloy. —SMITH'S *Wonders*.

COAL MINES.

ABOUT Mendip hills there is great plenty of coal. It is to be found indeed in most parts of Europe, but the English coal is of greatest repute even in foreign countries, and makes a considerable article of our commerce. The Mendip coal-mines are very subject to fire damps, by which many men have been killed, maimed, or miserably burnt. Some have been blown up at the mouth of the works, and the turn-beam, that hangs over the shaft of the pit, has been thrown off its frame by the violence of the blast. To prevent these mischiefs, the miners use no candles in their works, but those of a single wick, sixty or seventy to the pound, which give as great light there, as those of ten or twelve to the pound do in other places; and they always put them behind them, never presenting them to the breast of the work.

From these mines, and those of Kingswood, Gloucestershire, the city of Bristol is supplied with coals; but no part of England affords such prodigious quantities of this serviceable mineral as the pits about Newcastle-upon-Tyne. It is almost impossible to express the vast trade which this town carries on in this single article; for their coals are not only sent by sea to many other parts of England and Scotland, but also to Holland, and, in time of peace, to France and Flanders. But to give our readers a just idea of the wonderful consumption of Newcastle coal, we need only inform them, that from this inexhaustible source, the city of London is supplied, which alone is reckoned to consume annually at least 600,000 chaldrons, each chaldron containing six and thirty bushels. Nor should we forget the coal-pits near Whitehaven, in Cumberland, which is the most eminent part in England for its coal-trade, Newcastle excepted. From hence the city of Dublin, and all the towns of Ireland, on the coast, as well as some parts

of Scotland and the Isle of Man, are chiefly supplied; so that, in time of war, or upon account of contrary winds, it is no uncommon thing to see two hundred ships at once set sail from this place for Dublin laden with coals.

Under this article must be noticed a remarkable coal, called cannel, or candle-coal, which is found in some of the northern counties, particularly in Lancashire. It is light and glossy, apt to cleave into flakes, and, when kindled, yields a continual blaze till it is consumed to ashes. Its hardness renders it capable of a fine polish; and standishes, cups, candlesticks, &c., are frequently made of it. Though it is as black as jet, it will not soil the finest handkerchief.

There is another uncommon kind of coal dug up in Staffordshire, called Peacock-coal; because, when turned to the light, it shows all the colours in the peacock's train; but it is too soft to be polished.—SMITH'S *Wonders*.

SILVER MINE OF SAHLBERG, IN SWEDEN.

THE mine of Sahlberg is situated half a league from Sahla, a small and very badly-paved town in Sweden, and belongs entirely to individuals. It is divided into 160 lots or shares—a portion of land and some ground in the town belonging to each lot.

The works of this mine, observes the writer, are highly deserving of notice, and wonderful. You descend by a mouth, called Queen Christina's, the opening of which is 29 feet by 19; this leads to the first gallery. The manner of going down in buckets is unpleasant to many; yet, what may tend to give courage to the adventurer, no example was ever known of the cord breaking; and if any accidents ever happen, which occasionally do, to the number of two or three in the year, it is uniformly owing to imprudence and carelessness. A singular prejudice prevails here with respect to women; the workmen pretending that as often as one enters the mine, some misfortune will inevitably follow. A woman went down a few years ago, and a workman two days afterwards committed suicide. This catastrophe has in no wise tended to diminish the prejudice, the workmen, consequently, look

with an evil eye on any woman who may attempt to go down, a matter which rarely happens.

The bucket in which you descend is fastened to a rope, which is changed every ten months, and which afterwards serves to draw up the ore. We were six minutes, continues the writer, in going down, and six and a half in ascending, on account of the movement lessening as the bucket approaches the surface. As one bucket ascends another goes down for the ore; the bucket for the descent of the men is always the same, and both those for the ore and the men are constantly in motion day and night. As you go down, you provide yourselves with torches, in order to see the galleries worked in the shaft, as well as to direct the bucket, and prevent its striking against the projecting parts of the rock. One cannot help feeling a little frightened at experiencing now and then a somewhat sensible shock, and which alarm is augmented by one's critical situation. This shock is occasioned by the rope in turning round, the cylinder sometimes rolling over its own coils; and after some turns, upon its unwinding, it causes a vibration, which is communicated through the whole length of the cord, and even to the bucket itself. The two wheels which draw up the bucket are double, and are acted upon by water; they are adapted so as to bear being turned one way or the other, and increase or diminish their velocity, by means of flood-gates, which are raised more or less: they are also stopped at pleasure. This wholly depends on the man employed in the direction of the ropes, and who is admonished by a call from the top of the mine. His business requires the nicest attention; for any imprudence or forgetfulness might have the most disastrous consequences. These two wheels are 40 feet in diameter, as well as the two employed for the pumps. The water, which works the different machinery, flows through a canal of more than three miles in length. There are three rows of pumps to the hydraulic engine for pumping the water out of the mine. On the side is a well, called *knect*, by which you may descend the mine, by means of ladders, to the depth of 80 fathoms. You perceive afterwards a number of steps, by which you may go down lower, even to the first gallery; whence you have again the choice of descent,

either by means of the bucket or ladders, to the deepest gallery of the mine. These ladders, however, are not very convenient, and are used by those workmen only who are employed at the pump, every body giving the preference to the buckets. There are a number of marks on the rope, for the purpose of stopping the bucket at the galleries worked in Queen Christina's shaft. There is a great consumption of wood in this mine, for splitting the rock; and in different parts are lighted fires, which have a fine effect. All the vaults are exceedingly hard, the communications very large and extremely neat; you might drive a carriage through the whole of the first bottom. There is here a small apartment for visitors to rest themselves in, and a register for the inscription of their names.

Another mode of descending, is by means of ropes only, in which the adventurers frequently suffer very severely from the experiment.

The name of the place where the foundry is, to which the ore is brought, is named Sahlahutta, and is a quarter of a league from the town of Sahla. As you travel thither, you notice a number of houses, standing by themselves, for fear of fire, which serve as magazines for storing the corn, grain, and forage of the inhabitants. All the houses of Sahlahutta are occupied by different persons belonging to the foundry. A river which passes through it serves to work a number of wheels. More than 200 workmen are employed at the foundry, and a like number at the mines. The stones drawn from the mines are carried into a building containing 32 pestles, moved by wheels, which serve to reduce them to powder. There are two sorts of powder, the one called flour or dust, and the other paste; the first of which is the best. The ore thus pounded runs off into wooden receivers, is spread upon sheets of coarse cloth, and washed by water which falls over it, and is stirred with a sort of blunt stick; this operation is termed the washing. In this part of the building there are eight washing-machines, and fifty-six are distributed in other places. The washing yields two kinds of ore; that which remains at the bottom is the richest. From this part we went to the place where it is calcined; they make use of wood for heating their furnaces, two in

number. In another building, a wheel acts upon eight pair of bellows, and a number of wooden mallets are used to pound the charcoal, which is afterwards mixed with clay, and serves to form the bed on which the lead and silver runs, upon their flowing from the furnace. In another building, the calcined ore is thrown upon burning charcoal. In this building, there are four furnaces on the first story; and in one adjoining, two others, of like description, much less high. The melted matter falls, and, when the scoria is taken off, an iron crow is struck into the body of the furnace, and the metal runs into a hole made in the ground; by a second process, it is shaped into ingots, in moulds, and in this state it is simply silver and lead. Adjoining is a house containing a furnace, in which the lead is separated from the silver; in this operation the lead becomes vitrified, and is afterwards reduced to its natural state. This operation takes up forty-eight hours. A very hot fire for eight or nine hours is requisite, as a last process, to purify the silver entirely from the little lead which still remains; this is done in a brick furnace, placed under a bell.—FORTIA'S *Travels.*

IRON MINES.

THIS useful metal, (iron,) of which our island affords no small quantities, is indeed, with respect to real usefulness, the most valuable of all metals; it consists of an earth, salt, and sulphur—but all impure, ill-mixed, and ill-digested, which renders it extremely liable to rust. It is the hardest, driest, and most difficult to melt, of all metals. It may be softened, however, by heating it often in the fire, hammering it, and letting it cool of itself; and it is hardened by being extinguished in water. Of all the iron-works in England, those in the forest of Dean, in Gloucestershire, are in most repute. The ore is found there in great plenty, differing much in colour, weight, and goodness. The best, called brush ore, is bluish, very ponderous, and full of little specks, that shine like silver. This affords the greatest quantity of iron; but, if melted alone, the metal is very brittle, and therefore not

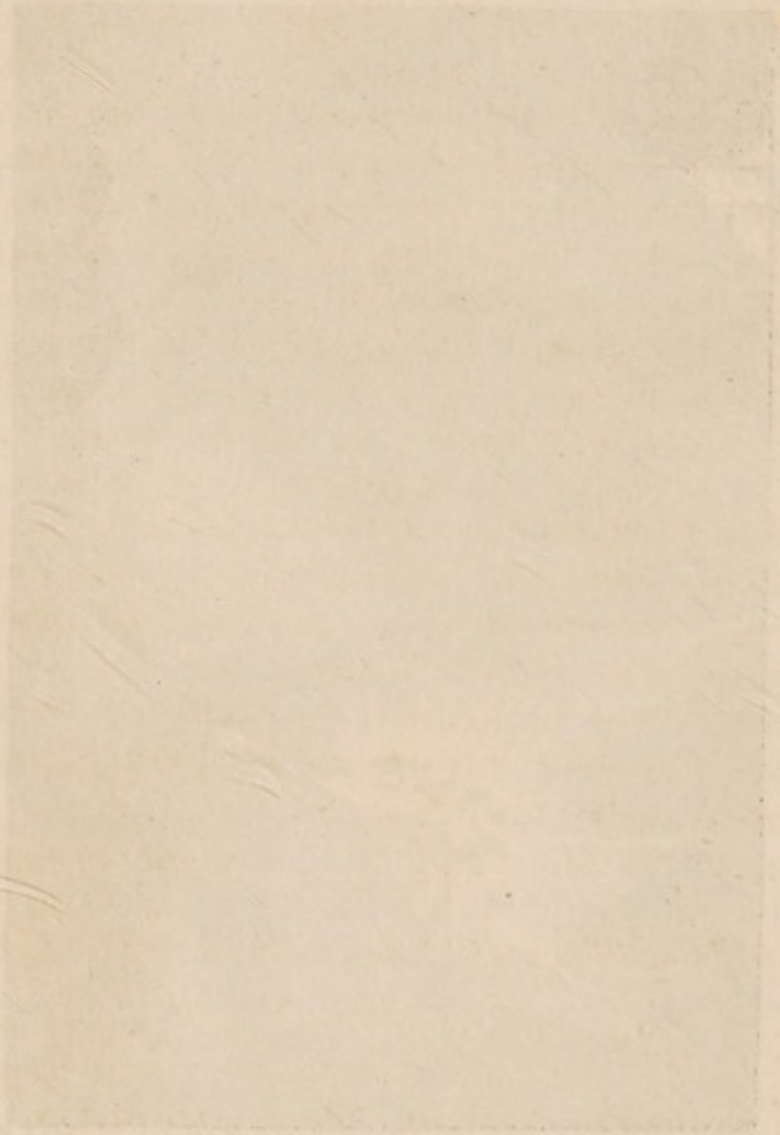
so fit for use. To remedy this, they mix it with a due quantity of cinder, (which is the refuse of the ore, after the metal has been extracted,) and this gives it such admirable toughness, as makes it equal to any that is brought from foreign countries. After the workmen have dug up the ore, their first business is to calcine it, which is done in kilns, much like our ordinary lime-kilns. These they fill to the top with coal and ore, a layer of each alternately; then setting fire to the bottom, they let it burn till the coal is wasted, and renew the kilns with fresh ore and coal in the same manner as before. This does not melt the metal, but consumes the more drossy part of the ore, and makes it malleable; serving instead of the beating and washing used with other ores. After this operation, it is carried to the furnaces, which are built of brick or stone, about 30 feet high, and somewhat resembling the shape of an egg, being about 10 feet wide in the middle, but much narrower at the top and bottom. Behind the furnace are fixed two large pair of bellows, the noses of which meet at a little hole near the bottom; these are worked by a large wheel, turned about by water, and are so contrived as to play alternately, the one giving the blast whilst the other is rising. The furnace is filled with ore and cinder, intermixed with charcoal, which being set on fire, the materials run together into a hard cake or lump; and the metal, as it melts, trickles down into receivers at the bottom of the furnace, where there is a passage open for the men to take away the scum and dross, and let out the metal as they see occasion. Before the mouth of the furnace lies a great bed of sand, wherein they make furrows of what shape they please; and when the receivers are full, the metal is let into them. In this manner they keep the furnaces constantly employed for many months together, never suffering the fire to slacken night or day, but still pouring in at the top a fresh supply of ore and fuel, which in these works is always charcoal; and from hence the sows and pigs of iron are carried to the forges, where they are wrought into bars.—SMITH'S *Wonders.*

IRON-MINE AT DALMORA.

THE mines of Dalmora (says a modern traveller), are celebrated for producing the finest iron ore in Europe. It is not dug as in the mines of tin and coal in England, but torn up by powder. This operation is performed every day at noon, and is one of the most tremendous and awful it is possible to conceive. We arrived at the mouth of the great mine, which is nearly half an English mile in circumference, in time to be present at it. Soon after twelve o'clock, the first explosion began, which I cannot compare to any thing so aptly as subterraneous thunder, or volleys of artillery discharged under ground, and the concussion was so violent as to shake the surrounding earth on every side.

As soon as the explosions were finished, I determined to descend into the mine, though there was no way to do this but in a large deep bucket, fastened by chains to a rope. The inspector, at whose house I had slept the preceding night, took no little pains to dissuade me from the resolution, and pointed out the melancholy accidents that sometimes happened on such occasions. Finding, however, that I was deaf to all his remonstrances, he provided a clean bucket, and put two men in it to accompany me. I am not ashamed to own, that when I found myself suspended between heaven and earth by a rope, and looked down into the deep and dark abyss before me, to which I could see no termination, I shuddered with apprehension, and half repented my curiosity. This, however, was only a momentary sensation, and before I had descended 100 feet, I looked round on the scene with tolerable composure. I was near nine minutes before I reached the bottom, it being 80 fathoms, or 480 feet deep. The view of the mine, when I set my foot on the earth, was awful and sublime in the highest degree: whether terror or pleasure formed the predominant feeling, as I looked at it, is hard to say. The light of the day was very faintly admitted into these subterraneous caverns, in many places it was absolutely lost, and flambeaux supplied its place; I saw beams of wood across from one side of the rock to another, where the miners sat employed in boring holes for

IRON MINES OF DALMORA.



the admission of powder, with the utmost unconcern, though the least dizziness, or even a failure in preserving their equilibrium, must have made them lose their seat, and dashed them to pieces against the ragged surface of the rock beneath. The fragments, torn up by the explosion previous to my descent, lay in vast heaps on all sides, and the whole scene was calculated to inspire a gloomy admiration.

I remained three quarters of an hour in these gloomy and frightful caverns, and traversed every accessible part of them, conducted by my guides. The weather above was very warm; but here the whole surface of the ground was covered with ice; and I found myself surrounded with the colds of the most rigorous winter, amid darkness and caves of iron. In one of these, which ran a considerable way under the rock, were eight wretches warming themselves round a charcoal fire, and eating the scanty subsistence produced from their miserable occupation. They rose with surprise at seeing so unexpected a guest among them: and I was not a little pleased to dry my feet, wet with treading on the melted ice, at their fire.

There are no less than one thousand eight hundred men constantly employed in these mines, and their pay is only a copper dollar, or three pence English per day. They were first opened about 1580, under the reign of John III.; but have been worked constantly ever since that time.—Smith's *Wonders.*

SINGULAR DISCOVERY OF A QUICKSILVER MINE.

The mines of quicksilver, near Idrad, in Carniola, are perhaps the richest of their kind in Europe; aud were first discovered in the year 1497, in the following singular manner:—A cooper having one evening placed a new tub under a dropping spring, in order to try if it would hold water, when he came in the morning found it so heavy, that he could hardly move it. At first the superstitious notions, that are apt to possess the minds of the ignorant, made him suspect that his tub was bewitched; but at last perceiving a shining fluid at the bottom, he went to Laubatch, and showed it to an apothecary, who immediately

dismissed him with a small gratuity, and bid him bring some more of the same stuff, whenever he could meet with it. This the poor cooper frequently did, being highly pleased with his good fortune, till, at length, the affair being made public, several persons formed themselves into a society, in order to search farther into the quicksilver mine. In their possession it continued, till Charles, Duke of Austria, perceiving the great importance of such a work, gave them a sum of money, as a compensation for the expenses they had been at, and took it into his own hands.

The subterraneous passages of this mine are so extensive, that it would take up several hours to go through them. The greatest perpendicular height, computing from the entrance of the shaft, is 840 feet; but as they advance horizontally under a high mountain, the depth would be much greater, if it were measured from the surface of the hill. One way of descending down the shafts is by a bucket; but as the entrance is narrow, the bucket is liable to strike against the sides, or to be stopped in the way, so that it may be easily overset. The other way of going down is that of descending by a great number of ladders placed obliquely; but as the ladders are wet and narrow, a person must step very cautiously to prevent himself from falling. In some of the subterranean passages the heat is so intense, as to throw a man into a profuse perspiration; and formerly, in some of the shafts, the air was so extremely confined, that several miners were suffocated by a kind of igneous vapour; but by sinking the main shaft deeper, the progress of this mischief has been happily prevented. Near the main shaft is a large wheel, and an hydraulic machine to raise the water from the bottom of the mine.

Virgin mercury is prepared by nature, and is found in some of the ores of this mine, in a multitude of little drops of pure quicksilver; it is also to be met with in a kind of clay, and sometimes flows down the passages or fissures of the mine in a small continued stream, so that a man has frequently gathered in six hours thirty-six pounds of virgin mercury, which bears a higher price than common quicksilver. The rest is extracted from cinnabar, or ore of quicksilver, which is pounded, washed, and distilled in

large iron retorts, whence the mercury comes over pure into a receiver. Eight hundred retorts are employed at one time in the furnaces belonging to this mine; and we judge of the vast quantities of quicksilver procured from them by the remarks of an intelligent traveller, who tells us, that he saw in the castle, above 470 tons of it in barrels, and in another place, as much ore as would take up two years to distil.

Many of the miners are afflicted with a nervous disorder, accompanied with violent tremblings, convulsive motions of the hands and legs, and frightful distortions of the face. These disorders may be chiefly attributed to the virgin mercury, which in a surprising manner insinuates itself into the bodies of the miners, so that when they go into a warm bath, or are put into a profuse sweat by steam, drops of pure mercury have been actually known to issue through their pores. These mines are sometimes infested with rats and mice, which feed on the crumbs of bread, &c., dropped by the miners at their meals; but these animals soon fall victims to the same convulsive disorders which attack the workmen.—SMITH'S *Wonders.*

CHAPEL OF SALT, IN A SALT MINE.

THE salt mines near Eperies, in Upper Hungary, are said to be 180 fathoms in depth, and the salt runs in such prodigious large veins, that the miners sometimes dig masses of ten thousand weight; but these are usually cut into square pieces of about two feet long, and twelve inches thick, for the conveniency of drawing them out of the mine. The colour of the ordinary stone is rather grey, but when broken and ground for use, it becomes as white as if it had passed through the hands of a refiner. Some of the salt is of a delicate blue colour, some yellow, and some as hard and transparent as crystal, the latter of which is frequently wrought into toys, or elegant small utensils. The water of this mine, when boiled, affords a blackish salt, which is generally given to cattle.

An attentive spectator, in roving through these subterraneous caverns, must of necessity admire the curious flowers of salt, which grow like the beard of a goat, but

appear of superior fineness and delicacy. These plumes are extremely brittle, and will easily melt in moist places, but they consist of the purest, whitest, and most beautiful salt that can be imagined. They are not, however, to be found in all the cuts, nor at all times; for their appearance depends entirely upon the temperature of the season. But the most remarkable curiosity in this mine is a chapel, with an altar, pulpit, sacristy, and seats, all cut out of a rock of salt; this chapel is sufficiently large to accommodate a hundred persons, and here divine service is annually celebrated by a Jesuit from the neighbouring town. —SMITH'S *Wonders.*

VAST EXTENT OF AN HUNGARIAN GOLD MINE.

OF the Hungarian gold mines, the most considerable is that of Chremitz, which is about 960 feet in depth, several miles in length, and has been wrought above 940 years. The veins generally run in a north or easterly direction, and the miners direct themselves, in their subterranean progress, by a compass. Some of the old passages in this mine, by being long disused, are entirely closed up again, and others are becoming very narrow, the rocks growing and uniting by degrees, especially in moist places. Pieces of pure gold, of a considerable size, have been sometimes found in this mine; but the gold is generally bedded in a sort of stony glebe, or ore of different colours. Various methods are used to separate the gold from the ore, but the most usual one is thus :—After the ore has been broken and pounded very small, the workmen lay it upon fine cloths, washing and stirring it about until all the earthy parts are washed away, and the heavier metalline particles remain behind. The cloths used upon this occasion are afterwards washed clean in several tubs; the water is again poured off from its sediment; and the metalline particles, after being well kneaded with quicksilver, are washed a third time in a wooden vessel. The gold and quick silver being then thoroughly mixed, they strain off as much of the latter as they can, through two cloths, and lay the remaining mass upon a perforated plate, over a deep pan fixed in the ground. This pan being closely

covered, and a charcoal fire kindled under it, the remaining quicksilver is drawn down into the bottom of the pan. The gold is then thrown into a fire, where it undergoes a complete purification.—SMITH's *Wonders*.

TIN MINES.

AMONG the various metals and minerals produced in England, none is more considerable than its tin, the greatest part of Europe being supplied with that article from the mines in Cornwall. The chemists look upon tin as a species of imperfect metal, generated of two different seeds, *viz.*, that of silver, and that of lead, and it is frequently found both in lead and silver mines.

How long the tin mines have been discovered or worked, cannot possibly be ascertained; but it is certain that the ancient Britons, if not the Romans, converted them to their advantage. Under the Saxons they appear to have been neglected; but after the coming in of the Normans, they produced very considerable revenues to the earls of Cornwall, particularly to Richard, brother of king Henry III. Several regulations were afterwards made to encourage adventurers; a charter, and various immunities being granted by Edmund, earl Richard's brother, who also framed and ratified the * stannary laws, laying a certain duty upon the tin, payable to the earls of Cornwall. Edward III. confirmed the tinners in all their privileges, and erected Cornwall into a dukedom, with which he invested his son, Edward the Black Prince; and since that time, the heirs apparent to the crown of England, if eldest sons, have enjoyed it successively.

The working of the tin mines is extremely difficult, not only on account of the great depth to which the workmen are sometimes obliged to sink their shafts or pits, but also

* These are laws relating to the tin mines, which from stannum, (tin) are called stannaries. There are five stannary courts in Cornwall, which have their respective jurisdictions, and as many towns where the tin must be coined, or stamped with the seal of the duchy. When the legal duties are paid, the tinner may sell his tin where he thinks proper; but if the king, or the duke of Cornwall, wishes to purchase it, they may always claim pre-emption.

because the rocks through which a passage is to be cut, are so hard, that they can scarcely dig a foot in a week. The soft shaking earth found in these mines is also very troublesome, on account of the unwholesome vapours it exhales, and the currents of water that frequently issue from it. When the ore is dug and drawn out of the mine, it is broken to pieces with large hammers, and then carried to a stamping mill, where it is pounded still smaller, and the water passing through, washes away the earthy parts, leaving the metallic ones behind. It is then dried in a furnace on iron plates, and ground to powder in a crasing mill; after which it is again washed and dried, and in this state the metallic matter is called black tin. To convert it into white tin, or metal, they carry it to a furnace, where, by means of a charcoal fire, kept up by very large bellows, it is smelted; and when it is cold, they forge it, which is the last thing done to it in the works. Two pounds of black tin, when smelted, yield about one of white. It is remarkable, that the dross or scoria scummed off the tin fusion, and melted down with fresh ore, runs into metal; and even the matter washed and separated from the metal in the mill, being thrown up in heaps, after resting six or seven years, will, by fetching over again, as they term it, yield as good tin as that of Germany.—SMITH'S *Wonders.*

COPPER MINES.

No part of Europe affords richer copper than Cornwall, though the mines have not been worked with considerable advantage much more than a century. It is there discovered in a vast variety of ores, the most common of which is of a yellow brass colour; but there are also red, grey, black, blue, and green; the black, blue, and green, yield but little; the grey contains more metal than the yellow, and the red more than the grey. There are besides, in most of the mines, considerable quantities of malleable copper, which from its purity, the miners term virgin ore. This is combined and allayed with various substances; sometimes with base crystal, sometimes with a gravelly clay, and sometimes with the rust of iron:

SALT MINES IN POLAND.

its figure is also very various, being sometimes in thin plates, shaped like leaves, sometimes in drops and lumps, sometimes branched, fringed, or twisted into wires; sometimes crossed at the top like a dagger, and sometimes resembling hollow filligree. It has also been found in powder, little inferior in lustre to that of gold, in solid masses of several pounds weight, maturated, unmixed, and highly polished, and in a congeries of combined granules. The water in which the copper ore is washed, has been discovered to make blue vitriol of the best kind; and that which comes from the bottom of the mines, is so strongly impregnated with copper, that were it detained in proper receptacles, it would produce great quantities of malleable copper, without any hazard or attendance, and with little more charge than the purchase of a much less quantity of the most useless old iron; which being immersed in this water, will, in about fourteen days, produce more than its weight of what is called copper mud, whence may be obtained a great proportion of pure copper.—SMITH'S *Wonders.*

SALT MINES.

AT Wielitska, a small town, about eight miles from Cracow, in Poland, is a remarkable salt mine, excavated in a ridge of hills at the northern extremity of the chain which joins to the Carpathian mountains, and has been wrought above 600 years; for they are mentioned in the Polish Annals, so early as 1237, under Boleslaus the Chaste, and not then as a new discovery; though how much earlier they were known cannot be ascertained. There are eight openings or descents into this mine, six in the field, and two in the town itself, which are chiefly used for letting down the workmen, and taking up the salt; the others being used for taking in wood and other necessaries. The openings are five feet square, and about four wide; they are lined throughout with timber, and at the top of each of them is a large wheel, with a rope as thick as a cable, by which things are let down and drawn up, and this is worked by a horse.

When a stranger wishes to gratify his curiosity by seeing the works, he must descend by one of these holes; he is first to put on a miner's coat over his clothes, and being led to the mouth of the hole, by a miner, who acts as a guide, the miner fastens a smaller rope to the larger one, and ties it about himself; he sits in this, and taking the stranger in his lap, gives the sign to be let down. When several persons go down together, the custom is, that when the first is let down about three yards, the wheel stops, and another miner takes another rope, ties himself, takes another in his lap, and descends about three yards further, the wheel there stops for another pair, and so on till the whole company are seated; then the wheel is again worked, and all the adventurers are lowered down together. It is no uncommon thing for forty people to go down in this manner. When the wheel is finally set agoing, it never stops till they are all down; but the descent is very slow and gradual, and it is a very uncomfortable time, while they all recollect that their lives depend entirely upon the strength of the rope. They are carried down a narrow and dark well, to the depth of 600 feet perpendicular; this is in reality an immense depth, but the terror and tediousness of the descent, makes it appear to most people, vastly more than it is. As soon as the first miner touches the ground at the bottom, he slips out of the rope and sets his companion upon his legs, and the rope continues descending till all the rest do the same.

The place where they are set down is perfectly dark; but the miners strike fire, and light a small lamp, by means of which, (each taking the stranger he has care of, by the arm) they lead them through a number of passages and meanders, all descending lower and lower, till they come to certain ladders, by which they descend an immense depth, and this through passages perfectly dark. The damp, cold, and darkness of these places, and the horror of being so many yards under ground, generally make strangers repent before they get thus far; but when at the bottom, they are well rewarded for their pains, by a sight that could never have been expected after so much horror.

At the foot of the last ladder, the stranger is received in a small dark cavern, walled up perfectly close on all sides.

To increase the terror of the scene, it is usual for the guide to pretend the utmost terror on the apprehension of his lamp going out, declaring that such an accident must be attended with the most fatal consequences. When arrived in this dreary chamber, he puts out his light, as if by accident; but, after some time, catches the stranger by the hand, and drags him through a narrow creek into the body of the mine, when there bursts at once upon his view a little world, the lustre of which is scarcely to be imagined. It is a spacious plain, containing a whole people, a kind of a subterranean republic, with houses, carriages, roads, &c. This is scooped out of one vast bed of salt, which is all a hard rock, as bright and glittering as crystal; and the whole space before him is formed of lofty arched vaults, supported by columns of salt, and roofed and floored with the same, so that the columns, and indeed the whole fabric, seem composed of the purest crystal. There are several lights in this place continually burning, for the general use; and the blaze of those reflected from every part of the mine, gives a more glittering prospect than any thing above ground can possibly exhibit.

Were this the whole beauty of the spot, it were sufficient to excite astonishment and admiration; but this is only a small part. The salt (though generally clear and bright as crystal,) is, in some places, tinged with all the colours of precious stones, as blue, yellow, purple, and green; there are numerous columns wholly composed of these kinds, and they look like masses of rubies, emeralds, amethysts, and sapphires, darting a radiance which the eye can hardly bear, and which has given many people occasion to compare it to the supposed magnificence of heaven. Besides the variety of forms in those vaults, tables, arches, and columns, which are framed as they dig out the salt, for the purpose of keeping up the roof, there is a vast variety of others, grotesque and finely figured, the work of nature; and these are generally of the purest and brightest salts. The roofs of the arches are, in many places, adorned with salt, hanging from the top in form of icicles, and having all the hues and colours of the rainbow. The walks are covered with various congelations of the same kind; and the very floors, when

not too much trodden and battered, are covered with globules of the same sort of materials.

In various parts of this spacious plain stand the huts of the miners and families, some single, and others in clusters like villages They have very little communication with the world above ground; and many hundreds of people are born and live all their lives here. Through the midst of this plain lies a road, which is always filled with carriages, loaded with masses of salt out of the farther part of the mine, and carrying them to the place where the rope belonging to the wheel receives them; the drivers of these carriages are all merry and singing, and the salt looks like a load of gems. A great number of horses are kept here, and, when once let down, they never see day-light again; but some of the men take frequent occasions of going up, and breathing the fresh air.

The instruments principally used by the miners are pick-axes, hammers, and chissels, with which they dig out the salt in forms of huge cylinders, each of many hundred weight. This is found the most convenient method of getting them out of the mine; and, as soon as got above ground, they are broken into smaller pieces, and sent to the mills, where they are reduced to powder. The finest sort of salt is frequently cut into toys, and often passes for real crystal. This hard kind makes a great part of the floor of the mine; and what is the most surprising in the whole place is, that there runs constantly through a large part of the mine a spring of fresh water, sufficient to supply the inhabitants and their horses, so that they have no need of any from above ground. The horses usually grow blind after they have been some time in the mine; but they do as well for service afterwards as before.

The salt dug from this mine is called ziebna, or green salt, but for what reason it is difficult to determine, its colour being an iron-grey; when pounded, it has a dirty ash colour, like what we call brown salt. The mine appears to be inexhaustible, as will easily be conceived from the following account of its dimensions, given by Mr. Coxe:—Its known breadth, says he, is 1,115 feet, its length 6,691 feet, and its depth 743. This, however, is to be understood only of the part which has been actually

worked: as to the real depth or longitudinal extent of the mine it is not possible to conjecture.—SMITH's *Wonders.*

EARTHQUAKES.

EARTHQUAKES are certainly the most formidable phenomena in nature; but, with respect to their causes, naturalists are much divided, some ascribing them to water, others to fire, and others to air; and all of them with some reason, though fire seems to be the chief: for those countries which contain the greatest store of sulphur, and other inflammable matters are most subject to earthquakes. Dr. Lister is of opinion, that the material cause of thunder, lightning, and earthquakes, is the same, *viz.*, the inflammable breath of the pyrites, which is a substantial sulphur, and takes fire of itself. Dr. Woodward, who ascribes earthquakes to the subterraneous heat of fire rarefying and swelling the waters of the abyss, till it can find a vent, observes, that the effects of these commotions are not very remarkable, except in countries that are mountainous, and, consequently, stony and cavernous underneath, since the fire naturally tends to those caverns where it meets with the readiest reception, and, the strata of stone making great opposition, the shocks are more violent, and the effects more terrible, than when they happen amongst gravel, sand, or such loose matter as makes little resistance. Hence it is that Italy, Sicily, &c., are so often alarmed with earthquakes, those countries being mountainous and cavernous, abounding with stone and marble, and affording great quantities of sulphur and nitre. The same ingenious author adds, that Etna, Vesuvius, and other volcanos, are only so many spiracles, serving to discharge the subterraneous fire when preternaturally assembled; and that, if this fire can come at these spiracles without any obstruction, it easily passes out, from time to time, without shaking or disturbing the

earth; but, when a communication is wanting, or too confined, it heaves and shakes the earth till it has made its way to the mouth of the volcano. He further observes, that there is scarce any country much annoyed with earthquakes that has not one of these fiery vents; which, when an earthquake happens, is constantly in flames, disgorging that fire, which, whilst underneath, was the cause of the disaster: so that the countries that have these volcanos, though they are troubled with earthquakes, would suffer much more if such spiracles were wanting, and the fire should continue imprisoned in the bowels of the earth.

To illustrate the process of nature in the production of earthquakes, it may not be improper to observe, that artificial ones may be made by mixing twenty pounds of iron-filings with an equal quantity of sulphur, and tempering the whole together with a little water, so as to form a mass, half dry, half moist. This being buried three or four feet in the ground will produce surprising effects in six or seven hours' time; for the earth will begin to tremble, crack, and smoke, and at last to send forth fire and flame, so as to resemble (if the quantity of matter were sufficient) a natural volcano.—SMITH'S *Wonders.*

THE Scriptures speak of several natural earthquakes; one of the most remarkable is that which happened in the twenty-seventh year of Uzziah, King of Judah, about 783 years before Christ. There is mention made of this earthquake by the prophets Amos and Zachariah; and Josephus says, that it was so violent as to divide into halves a mountain, which lay to the west of Jerusalem, and to remove one half of it 500 paces from its original site, insomuch that it closed up the high-way, and covered the king's gardens.

Another very remarkable earthquake was that which happened at the time of our Saviour's crucifixion. Many have been of opinion, that this motion was perceived by all the world; others maintain that it was sensible only in Judea, or even in the temple, the gates whereof were shaken, and the veil rent asunder. St. Cyril, of Jerusalem, says, that the rocks of Mount Calvary, which had

been split by the force of this earthquake, were still shown in his time. Orosius takes this earthquake to be the same which overturned the twelve cities of Sardis, Magnesia, Mosthene, Ægæ, Hierocæsarea, Philadelphia, Temolus, Temnus, Cyma, Myrinia, Apollonia, and Hyrcania; to which twelve cities Eusebius adds Ephesus. Pliny and Strabo make this the most direful concussion that ever was felt. It happened in the night, and proved the more dreadful as it was less apprehended. Most of the inhabitants were crushed under the ruins of their houses; and those who fled to the fields were swallowed up by the openings of the earth. It is reported by Tacitus, that huge mountains sunk into the earth; that plains were raised up into high hills; and that dreadful flashes and eruptions of fire were seen among the ruins. Phlegon, of Tralles, says, that many cities of Pontus, Sicily, Calabria, and Italy, were greatly damaged by it; and adds, that the earth opening in many places, discovered bodies of a monstrous size, from one of which a tooth was taken above a foot in length, and presented to the Emperor Tiberius: but as this earthquake happened, according to historians, in the fourth year of the reign of Tiberius, it could not have been the same that happened at the death of our Saviour, as it must have been fourteen years at least before it.

Towards the end of autumn, in the eighteenth year of Trajan's reign, and the 115th year of the Christian era, while the emperor was at Antioch, in Syria, that city was almost entirely ruined by one of the most dreadful earthquakes mentioned in history. The city was crowded with troops and strangers, come from all quarters, either out of curiosity or upon business and embassies; so that there was scarcely a nation or province in the whole Roman empire but what had a share in the calamity: and all the Roman world, says Dion Cassius, suffered in one city. The earthquake was preceded by violent claps of thunder, and a horrid noise under ground; then followed so terrible a shock, that several houses were overturned, and others tossed to and fro like a ship on the sea; while the noise of the cracking and bursting of the timber, the falling of the houses, and a dismal and loud roaring under ground, drowned the cries of the dismayed people.

Those who happened to be in their houses were, for the most part, buried under the ruins; and such as were walking in the streets were, by the violence of the shock, beat one against another, and most of them killed or dangerously wounded. As the earthquake continued, with some small intermission, for several days and nights, many thousands perished, among whom were some persons of great distinction. Trajan himself was much hurt, but escaped through a window out of the house where he was. It is also said, that Mount Lisan, which stood at a small distance from Antioch, bowed with its top, and threatened to fall down on the city; that other mountains fell; that new rivers appeared, and others, that had flowed before, forsook their course and vanished.

In the year of the Christian era 358, a most dreadful earthquake was felt in Asia, Pontus, and Macedon, which greatly damaged 150 cities, and utterly ruined that of Nicomedia, where it was so sudden and violent, that all the houses were overturned at once, and the inhabitants, to a man, buried in the ruins.

About the beginning of the reign of Constantine IV., frequent earthquakes happened, which were by far the most destructive that had been known for many ages. In Syria and Palestine several cities were swallowed up, and others entirely ruined; and some, if credit may be given to Nicephonis, removed, without any considerable damage, to a great distance from their former seats. At the same time happened an extraordinary darkness, which lasted from the 4th of August to the 1st of October, there being no distinction during that time betwixt day and night.

Smyrna has frequently suffered from earthquakes, and the inhabitants have a tradition, that the last, which happened in 1688, and overthrew the greatest part of the city, swallowed up the castle and a great number of houses, together with 5,000 of the inhabitants, and an immense quantity of merchandise, was the sixth earthquake of that kind, besides others less terrible and fatal; and they believe that a seventh will happen, which will destroy the place. The earthquake of 1688 was, in a few hours after, followed by a violent fire, which consumed almost all that remained of the city, and obliged the inha-

bitants to retire into the island of Chios, whence they could scarcely be persuaded to return.

But in the year 1759, almost all Syria was destroyed by earthquakes, which were felt throughout an extent of 100 leagues in length, and nearly as many in breadth, forming a space of 10,000 square leagues, containing the chain of mountains of Libanus and Anti-Libanus, with a prodigious number of villages, the greatest part of which were reduced to a heap of ruins. The first shock, which did no great damage, happened on the 10th of June; but the second, which happened on the 30th of October, did much mischief at Damascus, Tripoly, Seidon, Acri, and all along the coast of Syria. At Seidon a great number of the inhabitants were buried in the ruins of their houses; and at Acri the sea overflowed its bounds, and poured into the streets, though seven or eight feet above the level of the sea. The city of Saphat was entirely overthrown, and the greatest part of its inhabitants buried by the fall of their houses. All the minarets at Damascus were thrown down, and six thousand of the inhabitants perished. Several shocks were felt successively till the 25th of November, when they re-commenced with such violence, as overturned one third of the city of Damascus, and buried great numbers of people in the ruins, not less, according to some accounts, than 20,000. This earthquake also did considerable damage at Tripoly, so that the Franks and many natives deserted the city, and continued many days in the fields. The famous Balbec, and an ancient stone castle built by the Romans, have been entirely destroyed by these concussions.—Smith's *Wonders.*

EARTHQUAKE AT PORT ROYAL, JAMAICA.

In the year 1692, an earthquake happened in Jamaica, which in the space of two minutes destroyed the town of Port Royal, and sunk the houses in a gulf forty fathoms deep. It was attended with a hollow rumbling noise like that of thunder: and the streets rose like the waves of the sea, first lifting up the houses, and then immediately throwing them down into deep pits. All the wells discharged their waters with the most violent agitation; the

sea burst over its bounds and deluged all that stood in its way; the fissures of the earth were in some places so great, that one of the streets appeared twice as broad as formerly; and in many places it opened and closed again, continuing this agitation for some time. Of these openings, great numbers might be seen at once. In some, the people were swallowed up instantaneously; in others, the earth caught them by the middle, and crushed them to death; while others, more fortunate, were swallowed up in one chasm, and thrown out alive from another. Some chasms were large enough to swallow up whole streets; and others, still more formidable, spouted up immense quantities of water, drowning such as the earthquake had spared. The whole was attended with noisome stenches the noise of falling mountains at a distance, *&c.*; and the sky suddenly turned dull and reddish, like a glowing oven.

Greatly as Port Royal suffered, however, more houses were left standing in it than on the whole island besides.

Scarcely a planting-house, or sugar-house, was left standing in all Jamaica. A great part of them were swallowed up, houses, people, trees, and all, in one gap; in lieu of which, afterwards appeared great pools of water, which, when dried up, left nothing but sand, without any mark that ever tree or plant had grown thereon. It was a remarkable circumstance, that although some houses were thrown several yards out of their places, yet they continued standing; and one plantation was actually removed half a mile from the place where it originally stood, without any considerable alteration. All the wells in the island, as well as those of Port Royal, from one fathom to six fathoms deep, threw their water out at the top with great violence. Above twelve miles from the sea, the earth gaped, and spouted out vast quantities of water into the air; yet the greatest violences were among the mountains and rocks, and it is a general opinion, that the cause of the earthquake lay among them. Most of the rivers were stopped up for twenty-four hours, by the falling of the mountains; till at length they formed new channels, tearing up in their way, trees, *&c.* After the great shock, those people who escaped got on board ships in the harbour, where many continued above two months,

the shocks all that time being so violent, and coming so frequently, accompanied with frightful noises, and sulphureous blasts, that they durst not go on shore. The consequence of the noisome vapours attending the earthquake was, a general sickness, which swept away upwards of 3,000 people.—SMITH's *Wonders.*

EARTHQUAKES AT SANTERINI, TURKEY.

IN the year 1650, the shocks of an earthquake, near Santerini, were accompanied with a roaring noise underground, sulphureous exhalations, and intolerable stench, and a black smoke, which rose out of the sea, mixed with flames, to a considerable height. The sea was there tossed backwards and forwards in such a manner, that it overflowed and destroyed 30,000 perches of land, and the air was so infected with exhalations from the fire, that twenty-five persons, and a great many beasts, were stifled. At length, when the force of the fire and earthquake had raised up a mass of earth and stones within eight or ten fathoms of the surface of the sea, a vent being opened on a sudden, the water rushed in like a torrent, and extinguished the fire, and thereby prevented the appearance of another island.

History affords several other instances of the surprising effects of these concussions of the earth near Santerini, and particularly M. Thevenot relates, that about the year 1638, a prodigious quantity of pumice-stones were cast up from the bottom of the sea, with such noise and roaring as resembled the discharge of artillery; insomuch that the inhabitants of Scio, which is above 100 miles distant, imagined the Venetian and Turkish fleets were engaged. The air was likewise so filled with noxious exhalations, that many people died in Santerini, and the silver in men's pockets or chests was tarnished, even at the distance of Scio and Smyrna. But we proceed to an account of the last new island that appeared in the Bay of Santerini, as given by F. Goree, who was an eye-witness of its formation.

On the 23d of May, 1707, after an earthquake that happened the night before, a new island was discovered

early in the morning by some seamen, who, not being able to distinguish what it was, and taking it for some wreck brought thither in the night-time, rowed immediately towards it; but finding a heap of rocks and earth, instead of a floating wreck, they hastened back again, and spread the report over Santerini.

The inhabitants were utterly confounded at the first sight of this phenomenon, but their surprise abated in a few days, and seeing no appearance of fire or smoke, some of them ventured to go on shore upon the new island. Their curiosity led them from one rock to another, where they found a sort of white stone that cut like bread, and very much resembled it in form, colour, and consistence. They also found great numbers of oysters adhering to the rocks, but whilst they were employed in gathering them, they perceived the island to shake under their feet, upon which they retired to their boats with the utmost precipitation.

With these motions and tremblings the island every day increased, not only in height, but also in length and breadth; though now and then it happened, that whilst it was raised and extended on one side, it sunk and diminished on the other. F. Goree observed a rock rise out of the sea, about 40 or 50 paces from the island, which continued four days together, when it sunk again and appeared no more; but several others appeared and disappeared alternately, which at last remained fixed and unmoved. During this time, the colour of the surrounding sea was changed, being at first of a light green, then reddish, and afterwards of a pale yellow, accompanied with a noisome stench, which spread itself over great part of Santerini.

The smoke appeared first on the 16th of July, not indeed from the island itself, but from a ridge of black stones which suddenly rose up about 60 paces from it, where the depth of the sea was before unfathomable. Thus for some time there were two separate islands, one of which was called the White, and the other the Black Island, by reason of their different colours; but, after some time, they united in such a manner, that these black rocks became the centre of the whole island. The smoke issuing from them was very thick, and of a whitish colour, like

that of a lime-kiln; which, being driven by the wind towards Santerini, penetrated many of the houses, but without doing any particular mischief.

In the night, between the 19th and 20th of July, the flames were observed to issue with the smoke, to the great terror of the inhabitants of Santerini, especially those of the castle of Scaro, who were not above half a league distant from the volcanic island. This island now increased very fast, large rocks daily springing up, which added sometimes to its length, sometimes to its breadth, insomuch that the additions from time to time might easily be perceived. The smoke also increased very considerably, and ascended so high as to be seen at Candia, Naxos, and other distant islands. During the night, it appeared like a column of fire, 15 or 20 feet high; and the sea at that time was covered in some places with a red or yellowish froth, whence proceeded such a stench over the whole island of Santerini, that the inhabitants were obliged to burn perfumes in their houses, and to make fires in the streets, to prevent infection. This did not last above a day or two, the froth being dispersed by a strong gale of wind; but another evil quickly followed, for the wind drove the smoke upon most of the vineyards of Santerini, whereby the grapes, in one night, were utterly parched up and destroyed. It was also observed, that the smoke sullied plate and copper, and caused violent head-achs, sickness, &c.

On the 31st of July, the sea was perceived to smoke and bubble near the island in two different places, where the water formed a perfect circle, and looked like oil when set upon the fire. This lasted for above a month, during which time many fish were found dead on the shore. The following night a dull hollow noise was heard like the distant report of cannon; which was immediately followed by flames of fire shooting up from the furnace to a great height in the air, where they suddenly disappeared. The next day the same hollow sound was heard several times and succeeded by a blackish smoke, which, notwithstanding a pretty fresh gale, rose up in the form of a column to a prodigious height; and this in the night would probably have appeared as it were all on fire.

On the 7th of August, the noise was different, resem-

bling that of large stones thrown into a deep well, and the extremities of the island seemed to be in great commotion. This noise, after it had lasted some days, was succeeded by another much louder, which so nearly resembled thunder, as hardly to be distinguished from three or four real claps, that happened about the same time. On the 21st, the fire and smoke were considerably diminished; but the next morning they broke out with greater fury than before. The smoke was red, and very thick, and the heat so intense, that all round the island the sea smoked and bubbled up in a most surprising manner. At night, Mr. Goree, viewing with a telescope the large furnace upon the highest part of the island, discovered sixty smaller openings or funnels, all of which emitted a very bright flame; and he imagined there might be as many more on the opposite side of the great volcano.

In the morning of the 23rd, our author observed the island was much higher than the day before, and that its breadth was increased by a chain of rocks springing up in the night, almost 50 feet above water. The sea was also covered again with the reddish froth above-mentioned, which always appeared when the island received any considerable additions, and occasioned an intolerable stench, till it was dispersed by the wind and the motion of the waves.

On the 5th of September, the fire opened itself another vent at the extremity of the Black Island, from whence it issued for several days, during which time there came but little out of the large furnace; and from this new passage it was surprising to see the fire dart up three several times to a vast height, resembling so many sky-rockets, of a glowing lively red. The following night the subterraneous thunder made a terrible noise, and immediately afterwards a thousand sheaves of fire, as it were, flew up into the air, where, breaking and dispersing, they fell like a shower of stars upon the island, which appeared all in a blaze, presenting to the astonished spectators a most dreadful and beautiful illumination. To these natural fire-works succeeded a kind of meteor, which hung for some time over the castle of Scaro like a fiery sword, and increased the consternation of the inhabitants.

On the 9th of September, the White and Black Islands

united, after which the western end of the island daily increased. There were now only four openings that emitted flames, which came out with great impetuosity, sometimes attended with a noise like a large organ-pipe, and sometimes like the howling of wild beasts.

On the 12th, the subterraneous noise was considerably augmented, having never been so dreadful, nor so frequent as that day and the following. The bursts of it, like a general discharge of artillery, were repeated ten or twelve times in 24 hours, and immediately after each clap the large furnace threw up huge red-hot stones, which fell into the sea at a great distance. These claps were invariably followed by a thick smoke, which spread clouds of ashes over the sea and the neighbouring islands.

On the 18th of September, an earthquake was felt at Santerini, which did no great damage, but considerably enlarged the burning island, and gave vent to the fire and smoke in several new places. The claps were also more terrible than ever, and so violent, that it seemed as if every house in Scaro must have been shaken to the ground; and in the midst of a thick smoke, which appeared like a mountain, one might see and hear large pieces of rock thrown up with as much noise and force as bullets from the mouth of a cannon, and afterwards fall down upon the island, or into the sea. One of the neighbouring islands was several times covered with these fiery stones, which being thinly incrusted with sulphur, gave a very bright light, and continued burning till that was consumed.

On the 21st of the same month, after a dreadful clap of subterraneous thunder, very great lightnings ensued; and at the same instant the new island was so violently shaken, that part of the large furnace came tumbling down, and huge burning rocks were thrown to the distance of two miles. This seemed to be the last effort of the volcano, and to have exhausted the combustible matter, especially as all was quiet for several days after; but on the 25th the fire broke out again with still greater fury, and among the claps there was one so terrible, that the churches of Santerini were presently filled with crowds of people expecting every moment would be their last, and the castle of Scaro suffered such a violent shock, that

the doors and windows both of that and the houses flew open. Thus the volcano continued to rage during the remaining part of the year, and in the month of January 1708, the large furnace, without one day's intermission throwing out stones and flames, at least once or twice, but oftener five or six times a day.

The 10th of February, in the morning, a pretty strong earthquake was felt at Santerini, which the inhabitants regarded as a prelude to greater commotions in the burning island. Nor were they deceived in their expectation; for soon after the fire and smoke issued in prodigious quantities, the claps like thunder were redoubled, and nothing appeared but horror and confusion. Rocks of amazing bulk were raised up to a great height above the water, and the sea raged and boiled to such a degree, that it occasioned a general consternation. Subterraneous bellowings were also heard without intermission, and sometimes in less than a quarter of an hour there were six or seven eruptions from the large furnace. The noise of the repeated claps, the quantity of huge stones that flew about on every side, the houses tottering to their very foundations, and the fire which now appeared in open day, surpassed all that had hitherto happened, and formed a scene tremendous beyond description.

The 15th of April was remarkable for the number and violence of the bellowings and eruptions, by one of which near a hundred large stones were thrown up together in the air, and fell again into the sea at about two miles distance. From this time to the 23d of May (the anniversary of the birth of the new island,) things continued much in the same state, but afterwards the fire and smoke subsided by degrees, and the subterraneous thunders grew less terrible.

On the 15th of July, our author, accompanied by the Latin bishop of Santerini, and some other ecclesiastics, hired a boat to take a near view of the island, and to land upon it if they found it practicable. They made directly towards it on that side where the sea did not bubble, but where it smoked very much. Being got into this vapour, they perceived a close suffocating heat, and found the water extremely hot; whereupon they directed their course towards that part of the island which was farthest

from the large furnace. The fires, which still continued to burn, and the boiling of the sea, obliged them to take a great compass, and yet they felt the air about them very hot and sultry.

Having coasted round the island, and surveyed it carefully from an adjacent one, they judged it to be two hundred feet above the sea, about a mile broad, and five miles in circumference: but not being thoroughly satisfied with this view of it, they resolved to attempt once more to land, and accordingly rowed towards that part of the island where no fire or smoke had been perceived: but when they had got within a hundred yards of the place, the great furnace discharged itself with its usual fury, and the wind blew upon them a thick smoke and a shower of ashes, which obliged them to quit their design. Having retired a little they let down a plummet, and had 90 fathom water without finding the bottom, the line not being long enough. On their return to Santerini, they observed that the heat of the water had melted most of the pitch from their boat, which was therefore grown very leaky.

From this time till the 15th of August, when F. Goree left Santerini, the fire, smoke, and noise continued pretty moderate; and by the accounts he received for several years afterwards, it appears that the island still increased, but that the fire and subterraneous noise were very much abated; and our author supposes, as there is no likelihood that the fire will make itself a passage at the bottom of the sea, so as to let in the water to extinguish it, that the volcano will not have an end, till the mine of sulphur that feeds it be entirely consumed.

As strange as it may seem, that islands should be raised from the bottom of the sea, the instance we have here given is unquestionably true; and some persons are of opinion, that Santerini itself originally emerged above the waves in the same manner. Other islands have undoubtedly been rent and separated from the continent by violent storms, inundations, and earthquakes; to some of which causes, perhaps our own island owes its formation; and it is observed, that the East Indies, which abound in islands more than any other part of the world, are likewise most annoyed with tempests, lightning, volcanos, earthquakes, &c. Varenius supposes, that St. Helena,

Ascension, and other steep rocky islands were formed by the sea's overflowing their neighbouring champaigns; and those of Zealand, Japan, &c., he thinks proceeded from the accumulation of vast quantities of sand and other terrestrial matters. Sumatra, Ceylon, and most of the East Indian islands, he imagines were rent off from the main land, and concludes, that the islands of the Archipelago were formed in the same way; to which he imagines that the flood might possibly contribute.

But not to dwell upon conjectures, we shall add another yet more recent instance than that already given, of an island raised out of the sea by subterraneous fires, as we find it related in the Philosophical Transactions. On the 10th of December, 1720, John Robinson, master of a small vessel from Piscataqua in New England, arrived at Tercera, one of the Azores; and sailing from thence, December the 18th, the next day, about two o'clock, he arrived at an island which was literally covered with fire and smoke. The following night the ashes fell on his deck like hail or snow, upon which he bore from the island, the volcano roaring as loud as great guns or thunder. At break of day he stood towards it again, and sailed round it so near, that the fiery matter it ejected had like to have done him damage; and being also in danger of driving ashore, the consternation was such, that all on board betook themselves to prayers; but a small gale springing up, carried them clear, and they stood away for Tercera. The governor there informed them, that the fire broke out in the night of the 20th of November preceding, being accompanied with a prodigious noise and an earthquake, which shattered several houses in Angra, the chief town of Tercera, as well as in the neighbouring villages. Vast quantities of pumice-stones and half broiled fish were found floating on the sea for many leagues round the island, and abundance of sea-fowl hovering about it.—SMITH'S *Wonders.*

EARTHQUAKE AT THE CARACCAS*.

On the 26th of March, 1812, at five o'clock in the afternoon, the first commotion took place. The air was calm, the heat excessive; nothing preceded or announced such a catastrophe. A shaking was first perceived, strong enough to set the bells of the churches a-ringing; it lasted about six seconds, and was followed by an interval of ten or twelve seconds, during which the earth exhibited an undulation similar to the motion of the sea in a calm. The crisis was then supposed to have passed; but immediately extraordinary subterraneous noises were heard, and electrical discharges infinitely stronger than atmospheric thunder. The earth was agitated with a quickness which cannot be described, and seemed to boil like water when subjected to the heat of a very strong fire. There was then a perpendicular rumbling, or *strepitus*, for about three or four seconds, followed by agitations in an opposite direction, from north to south, and from east to west, for three or four seconds also. This short but awful period was sufficient to turn the whole city of Caraccas topsy-turvy, with upwards of thirty towns, and the country-houses and numerous establishments spread over the surface of that delightful province! In an instant all was destroyed to an extent of 300 miles, and 80,000 inhabitants ceased to live, while thousands were dreadfully wounded.

The city of Caraccas, placed at the foot of the declivity of the highest mountain, called La Silla, and on the margin of an immense plain, through which several rivers flowed, was considerabiy elevated above the level of the sea, and always enjoyed a cool and agreeable temperature. The 26th of March (being Good Friday) had attracted all the inhabitants to the churches of the city which were destroyed, thus serving for their tombs. The

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* This interesting narrative is the production of a French gentleman, who resided many years in the Caraccas, and was an eye-witness to the scenes which he deseribes. He was taken prisoner, on his return to France on board the American ship Dolphin, by Captain Malcolm, of the Rhin frigate. To the latter gentleman our readers are indebted for the publication of the narrative.—Editor.

churches of La Trinidad and Alta Gracia, which were in the more immediate vicinity of the mountain, experienced more forcibly the effects of the extraordinary commotion; for, although originally upwards of 150 feet high, no part of their ruins exceeded five or six feet in height; and some idea may be formed of the violence of the shock which overturned these stupendous edifices, when it is recollected that they were supported by columns and pilasters exceeding 30 or 40 feet in circumference, and of which scarcely a vestige remains.

A superb range of barracks, two stories high, capable of containing 4,000 men, and serving as a depôt for the artillery, shared the same ruin. A regiment of the line, in the act of marching to join in a religious procession, was almost wholly swallowed up, a few men only being left alive.

It is impossible to paint the terror and desolation which this catastrophe occasioned; disorder, confusion, despair, misery, and fanaticism, were at their height. At first, every person fled as well as they were able, prostrating themselves to supplicate heaven for mercy. In this state, the individuals who escaped death, mutilated or wounded, covered with dust, their clothes torn, and carrying in their arms their children, or the sick and wounded, presented a most heart-rending spectacle. After the first moments of terror, in which self-preservation made every other consideration give way, the most painful recollections agitated those who had escaped; every one with distracted anxiety sought for a relation or a friend, and inquired for them with looks of terror and affright. Among the bloody and desolate ruins, those who remained of the unfortunate population were seen endeavouring to dig up, without other instrument than their weak and trembling hands, the living and the dead who were covered by the fragments. Every one ran to and fro over this vast burial-place, throwing themselves occasionally on the rubbish, and listening with an attentive ear to the groans of the unfortunate whose lives were preserved, although shut up, perhaps irrecoverably, in the very buildings where they had enjoyed tranquillity and happiness but a few minutes before.

The remainder of the day and the whole of the night

were devoted to this interesting and pious occupation. Next day, it was necessary to perform the last offices to the dead, but it was impossible to bestow on them the rites of sepulture; instruments and a sufficient number of persons were not to be found. In order to avoid the effects of a pestilence, therefore, from an infected atmosphere, the bodies were piled up at different stations, and burnt with the timber of the ruins. The first sad moments after the catastrophe were thus spent; other labours, equally if not more distressing, remained to be performed.

Almost all the provisions, furniture, linen, and the usual necessaries of life, were destroyed, or had been stolen by the lower class of the populace or the negroes; every thing was, in short, wanting. The violence of the earthquake had destroyed the water-pipes; and the rivulets were either dried up, or diverted from their usual course. There was, in fact, no water near the city; there were no vessels in which to collect it; and it was necessary to travel far off before a quantity sufficient to allay one's thirst was obtained, even by using the hands to carry it to the mouth.

Pressed by thirst and hunger and the want of an asylum, those who possessed country-houses fled towards them on foot. But, alas! nothing was spared; all was ruin and desolation: and they returned to the city, where they seemed to be less miserable among their companions in misfortune, the silence and solitude of the country apparently adding to the dismal aspect of nature.

The markets were without provisions; the farmers brought none into town; and many, after wandering about in search of food, at length lay down, and died of hunger: those who survived, obtained sustenance with much difficulty. Had not some cocoa, sugar, and maize, been saved, (which were retailed at a most exorbitant price,) more would have perished from hunger than from the effects of the earthquake.

Three thousand wounded, of all ranks, were collected, and placed at first on the banks of a river, under the shade of some trees; but they were absolutely in want of every thing, even the most indispensable requisites. They were abandoned to the medicine of consolation; they were told

that they must submit to the decrees of Providence, and that every thing was for the best.

During this awful crisis, a judicious observer of mankind might have witnessed a striking exhibition of the manners, character, and principles, by which the Spanish people are regulated in their conduct.

Their extreme insensibility is scarcely credible. I saw fathers of families who had lost five or six children, friends, relations, and their whole property, without shedding a tear; most of them consoling themselves by holding a conversation with an image of the Virgin, or some privileged saint*. Others gaily drowned their sorrow in rum; and all appeared much less grieved at the event, than they would have been at the loss of a process which affected their rank as nobles, or deprived them of their precedence in a public company, or at a religious procession.

It is too true, that human beings, naturally superstitious and ungrateful, never so cordially respect their deities or their kings when they are beneficent as when they are severe; the more rigorous they are, the more just and equitable are they esteemed. Such is the lot of mankind! they forget benefits; and governors, in order to acquire the homage which is due to them, must be feared. Gratitude and love are sentiments too delicate to be common among mankind.

Good Friday is, without doubt, the most imposing of the Catholic holidays. It is that which ought to inspire the most pious reflections; but at the Caraccas, as in many other places, on this occasion, the women are occupied with their dress, more anxious, perhaps, to appear amiable in the sight of men than to worship the Supreme Being. They think of nothing but amusement, and they almost forget that Being who does not manifest himself openly. But scarcely had they experienced the earthquake, when they said it was the thunder of heaven sent to punish the crimes of mortals. Their elegant clothes were immediately laid aside; those who had it in their power changed them for coarse garments, by way of showing their penitence:

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* The Divine Being, among the Spaniards, seems to be absolutely unknown. They never speak of him. It is the Virgin and the Saints who receive all their homage.

sackcloth, cords, and chains, were substituted for elegant fashions and seductive head-dresses. The ladies now subjected themselves to monastic discipline, and beat without remorse their bosoms, but a short time before adorned with the most costly jewels. Many of the gentlemen, at the same time, forgot their gallantry for fanaticism; and, in order to appease the anger of heaven, they walked night and day in processions, the body entirely uncovered with the exception of a large girdle, barefooted and with long beards, a cord around their necks to which was frequently attached a large stone, and on their shoulders they sometimes carried a wooden cross, 100 or 150 pounds in weight.

In the city, and throughout the country, there were processions day and night; every mountain was transformed into a Calvary, where the people dying with hunger implored the divine mercy, embracing with groans the relics of their tutelar saints.

Every one accused himself of having called down the anger of heaven, and of having caused the universal calamity. Those who could not meet with a priest, openly confessed their sins upon the highways, accusing themselves of robberies and murders which they had secretly committed.

In less than two days about 2,000 individuals (who perhaps never had any intention of the kind) were married; relations, formerly despised or neglected on account of their poverty, were now recognised; many unfortunate children, the fruits of an illegimate intercourse, who had never known father or mother, were now acknowledged and legitimated. At the same time an infinite number of restitutions were made, and law-suits terminated. But notwithstanding all this remorse, a singular and paradoxical spectacle was exhibited to the eyes of the philosopher. While one half of the multitude thus hastened to expiate their offences, the other half, who, perhaps, never had been guilty of any great crimes before, but possessing an accommodating conscience, profited by the confusion, and with the utmost composure committed every imaginable excess.

In the mean time the shocks from the earthquake continued; every day and every hour some ruins fell, which

had been only shaken by the first commotions. On the 5th of April, at four in the afternoon, there was a shock so violent, that several mountains were rent asunder, many inclined from their centre of gravity, and enormous detached rocks were precipitated to the valleys.

From the above hour until nine o'clock next morning the shocks were violent, and so frequent as to admit of an interval of about five minutes only between each; and during these intervals a rumbling subterraneous noise was heard, and the earth was continually agitated.

The succession of these phenomena was not interrupted, in the month of December, 1812, when I left the place, and those were reckoned the most tranquil days in which there were only fifteen or twenty shocks! Every thing was destroyed; the ramparts of La Guyra, not less than 20 feet in thickness, were thrown down. As a natural consequence of the opening of the mountains, which are the great reservoirs of water, some rivers were observed to have considerably increased. Many high mountains were rent right across the centre, and that called La Silla had sunk more than 60 fathoms.

It is difficult to say what will be the close of this dreadful event. It may be hazarded as a conjecture, however, that it will end in the opening up of one or more volcanos. In the mean time, the unfortunate inhabitants of these countries, attached to their native soil, and not wishing to abandon the ashes of their fathers, have with great labour erected rude habitations, in which they await with stoicism and resignation the termination of their calamities.—*Philosophical Magazine.*

EARTHQUAKES IN LIMA, SOUTH AMERICA.

The earthquakes that have happened in the city of Lima are very numerous; but we shall only mention wo of them. One of the most terrible was on the 28th of October, 1687, and began at four in the morning, with the destruction of many of the finest public buildings and houses, in which a great number of the inhabitants perished; but this was little more than a presage of what followed; for, two hours after the shock returned with

such impetuous concussions, that all was laid in ruins, and the inhabitants began to think themselves happy in the preservation of their lives, and being only spectators of the general devastation, and the loss of all their property. But during this second shock, the sea, retiring considerably, and then returning in mountainous waves, entirely overwhelmed Callao, and the adjacent country, together with the miserable inhabitants.

From that time six earthquakes happened at Lima before the dreadful one of 1746. This was at half an hour after ten at night, when the concussions began with such violence, that in little more than three minutes the greatest part if not all the buildings in this fine and beautiful city were destroyed, and those of the inhabitants who had not made sufficient haste into the streets and squares, were buried under the ruins. At length the terrible effects of this first shock ceased, but the tranquillity was of short duration, the concussions swiftly succeeding each other, and the fort of Callao sinking into ruins; but what the city had suffered from the destruction of its buildings was inconsiderable when compared with the dreadful catastrophe which followed; for the sea, as usual, receding to a considerable distance, returned in mountainous waves, foaming with the violence of the agitation, and suddenly turned Callao and the neighbouring country into a sea. This, however, was not perfectly performed by the first swell of the waves; for the sea, retiring still farther, returned with greater impetuosity, and covered both the walls and ruins of the place; so that what had even escaped the first, was now totally overwhelmed, by those terrible mountainous waves. In the harbour were 23 ships and vessels, great and small; nineteen of which were sunk, and the other four carried to a considerable distance up the country. This terrible inundation extended to other parts of the coast, and several towns underwent the same fate with the city of Lima.—SMITH'S *Wonders.*

TIDES.

THE phenomena of the tides, which are really astonishing, and have perplexed the greatest philosophers, are well explained by Dr. Halley, from the Newtonian principle of gravitation and attraction, whereby all terrestrial bodies have a tendency towards the centre of the earth, and are also attracted towards the sun, moon, and other planets. If the earth were not affected by the action of the sun and moon, the ocean, being equally pressed by the force of gravity towards the centre, would continue in a perfect stagnation, always at the same height, without either ebbing or flowing; but as the sun and moon have a like principle of gravitation towards their centres, and the earth is within the activity of their attraction, it plainly follows, that the equality of the pressure of gravity on the earth must be disturbed, and the ocean, being fluid and yielding to the least force, shows where it is pressed according to its rising or sinking. Now the moon being very near the earth, in comparison of the sun and other heavenly bodies, our tides are chiefly regulated by its motions; and accordingly we observe, that the sea flows as often as the moon cuts the meridian, whether above or below the horizon; and ebbs when she passes the horizon, both in the eastern and western point: but as the moon is 12 hours and 24 minutes in passing from the superior to the inferior meridian, so every tide of flood is 24 minutes later than the preceding one: and thus we have two fluxes and two refluxes every 25 hours.

The high spring-tides, upon the new and full moons, are occasioned by the attraction of the sun conspiring with that of the moon, whereas in the quarters the tides are weaker, because the sun raises the water where the moon depresses it. The reason why the sun's attraction has no greater influence on the tides, notwithstanding he is ten thousand times bigger than the earth and moon, is owing to the very small proportion the semidiameter of the earth bears to his immense distance. It is also observed, that the equinoctial spring-tides in March and September are

the highest, and the neap-tides the lowest of all others; for the nearer the moon approaches the poles, the less is the agitation of the ocean, which is greatest of all when the moon is in the equinoctial, or farthest distant from the the poles; whence the sun and moon being either conjoined or opposite in the equinoctial, produce the greatest spring-tides, and the subsequent neap-tides are always the least, being produced by the tropical moon in the quarters.

But besides these general tides, which would happen regularly every where, if the earth were all covered with deep sea, there are many others in which we find a vast diversity, and not to be accounted for, without an exact knowledge of local circumstances, as the position of the land, the shallowness of the water, the narrowness of the channels, &c., for the tide is always found to set strongest where the sea is narrowest, the same quantity of water being in that case to run through a smaller passage. This is evident between Portland and Cape la Hogue in Normandy, where the tide runs like a sluice, and would be yet stronger between Dover and Calais, if it were not checked by the tide coming round the island. In short, every thing relating to the tides is to be accounted for from the Newtonian doctrine; as why lakes, such as the Caspian sea, and midland seas, such as the Baltic, the Black Sea, and the Mediterranean, have scarcely any sensible tides; for lakes having no communication with the ocean, can neither increase nor diminish their water, so as to rise or fall; and seas that communicate with it by such narrow inlets, and are of such a vast extent, cannot in a few hours receive or empty water enough to raise or sink their surface in a sensible manner. Sir Isaac Newton accounts for the strong tides in the port of Tonquin in China, (where there is but one flood and ebb in 24 hours, and none at all when the moon is near the equinoctial,) from the concurrence of two tides, the one out of the great South Sea, the other out of the Indian Sea between the islands; and as the appearance of those tides is naturally deducible from his principles, it is a strong argument in favour of his whole theory.

We shall conclude this subject with observing, that though the Mediterranean has no sensible tides, except some small ones in the Gulf of Venice and that of the

Euripus, &c., yet a strong current continually sets into it from the ocean through the straits of Gibraltar, and likewise through the Hellespont from the Euxine and the Propontis; whence one would imagine, that instead of not swelling like the ocean, it should rather overflow its bounds, and inundate the adjacent countries. What becomes of the vast quantity of water thus poured into the Mediterranean, is a speculation that has long employed the philosophers. Dr. Smith accounts for it, by supposing an under current to carry off as much water as the upper one brings in, and such currents it is probable there are in several parts of the sea; but Dr. Halley, without having recourse to this hypothesis, solves the phenomenon from the great evaporation. The result of an experiment, made by this excellent author, to find the quantity of vapour raised from the sea by the action of the sun, was, that the thickness of water evaporated from the surface of the sea in summer, is one fifty-third part of an inch in the space of two hours, which, for the ease of calculation, being supposed only a sixtieth part, the quantity exhaled in twelve hours will be one-tenth of an inch. On this principle, every square mile will be found to evaporate in twelve hours 6,914 tons of water; and every square degree, supposed of 69 English miles, will evaporate 33 millions of tons. Now the area of the Mediterranean being estimated at 160 square degrees, it will lose in vapour, in a summer's day, 5,280 millions of tons; and yet this quantity of vapour, great as it is, is only the remains of what is raised by the winds, which sometimes sweep off the water faster than it is exhaled by the heat of the sun.

With respect to the quantity of water received by the Mediterranean, the Doctor supposes the Ebro, Rhone, Tyber, Po, Danube, Neister, Boristhenes, Tanais, and Nile, to furnish each of them ten times as much water as the Thames; not that any of them are in reality so great, but so to allow for the lesser rivers that fall into it; and as the Thames is computed to evacuate daily 20,300,000 tons of water, the nine rivers above-mentioned will only evacuate 1,827 millions of tons in a day, which is little more than a third of what is raised in that time in vapour. To this vast store of vapours raised by the sun, winds, or

subterraneous fires, from the sea, lakes, rivers, &c., the Doctor refers the origin of springs.

This account may serve to explain why the Caspian sea, into which many vast rivers discharge themselves, and which has no visible outlet, does not overflow its banks; and it may also show why the Almighty has placed spacious lakes in many other countries, at a distance from the sea. Were it not for these bodies of water that supply the clouds with rain, such countries would have no refreshing showers; the reservoirs in the hills and mountains, which gush out in springs, and give rise to many rivers, would soon fail: water would be in a manner unknown, vegetation would gradually cease, and many regions, now remarkable for their fertility, would become barren and desolate.—SMITH's *Wonders.*

LIGHT-HOUSES.

THE PHAROS OF PTOLOMY.

THE wonderful light-house, named Pharos, from the island of Pharos, on which it stood, was surrounded on all sides by water. It was a most magnificent tower, consisting of several stories, and galleries, with a lantern at top. It was of a prodigious height, and its lantern continually burning, could be seen for many leagues at sea, and along the coast. It was built for the benefit and direction of sea-faring men, by one of the Ptolomies, in the year of the world 3670, under the direction of the architect Guidius, who dedicated it to its founder. But in after-times, that being decayed, another inscription appeared finely cut in marble, *viz.*, "Sostrates Gnidius, son of Dixiphanes, consecrated this work to the gods, our preservers, for the benefit of sea-faring men." How long this structure stood, is not very certain, but it was of such universal esteem, that we find antiquity called all the light-houses after it, by the common name of Pharos.—*Old Universal Magazine.*

THE COLOSSUS OF RHODES.

This enormous building has justly been classed among the wonders of ancient architecture. It was a vast structure of brass, or statuary metal, erected in honour of Apollo, or the sun, the tutelar god of the island, whose stride was 50 feet asunder, each foot being placed on a rock at this distance from each other, and which bounded the entrance into the haven. Its height, according to Pliny, was not less than 105 feet, or 70 cubits; and hence ships of considerable burden were capable of sailing between its legs. It is said to have been erected by the Rhodians, with the money produced by the sale of the engines of war which Demetrius Poliorcetes employed in fruitlessly besieging the city for a twelvemonth, and which he gave to them upon his reconciliation. Pliny affirms that it was commenced by Chares of Lindus, a disciple of Lysippus, and finished upon his death by Laches of the same town. It was thrown down by an earthquake 60 years after its completion.—*Gallery of Nature and Art.*

THE EDDYSTONE LIGHT-HOUSE.

This most celebrated light-house is built on the Eddystone rocks. These are situate nearly S. S. W. from the middle of Plymouth sound, according to the true meridian. The distance from the port of Plymouth is nearly 14 miles; and from the promontory called Ramhead, about 10 miles. They are almost in the line, but somewhat within it, which joins the Start and the Lizard points; and as they lie nearly in the direction of vessels coasting up and down the channel, they were necessarily, before the establishment of light-houses, very dangerous, and often fatal to ships under such circumstances. Their situation, likewise, with regard to the Bay of Biscay, and the Atlantic Ocean, is such, that they lie open to the swells of the bay and ocean from all south-western points of the compass, which swells are generally allowed by mariners to be very great and heavy in those seas, and particularly in the Bay of Biscay. It is to be observed, that the soundings

COLOSSUS AT RHODES.

of the sea from the south-westward, toward the Eddystone, are from 80 fathoms to 40, and every where till you come near the Eddystone, the sea is full 30 fathoms in depth; so that all the heavy seas from the south-west come uncontrolled upon the Eddystone rocks, and break on them with the utmost fury.

The force and height of these seas is increased by the circumstance of the rocks stretching across the channel, in a north and south direction, to the length of above 100 fathoms, and by their lying in a sloping manner toward the south-west quarter. This striving of the rocks, as it is technically called, does not cease at low water, but still goes on progressively; so that, at 50 fathoms westward, there are 12 fathoms water, nor do they terminate altogether at the distance of a mile. From this configuration it happens, that the seas are swelled to such a degree in storms and hard gales of wind, as to break on the rocks with the utmost violence.

The effect of this slope is likewise sensibly felt in moderate, and even in calm, weather, for the liberation of the water, caused in the Bay of Biscay in hard gales, at south-west, continues in those deep waters for many days, though succeeded by a calm; insomuch, that when the sea is to all appearance smooth and even, and its surface unruffled by the slightest breeze, yet those librations still continuing, which are called the ground swell, and meeting the slope of the rocks, the sea breaks upon them in a frightful manner, so as not only to obstruct any work being done upon the rock, but even the landing upon it, when, figuratively speaking, you might go to sea in a walnut-shell. A circumstance which still farther increases the difficulty of working on the rocks is, there being a sudden drop of the surface of the rock, forming a step of about four and a half, or five feet high, so that the seas, which in moderate weather come swelling to this part, meet so sudden a check, that they frequently fly to the height of 30 or 40 feet.

Notwithstanding these difficulties, it is not surprising that the dangers to which navigators were exposed by the Eddystone rocks, should make a commercial nation desirous of having a light-house on them. The wonder is, that any one should be found hardy enough to undertake

the building. Such a man was first found in the person of Henry Winstanly, of Littlebury, in Essex, gent., who, in the year 1696, was furnished by the master, wardens, and assistants, of the Trinity-house, of Deptford Strond, with the necessary powers to carry the design into execution. He entered upon this undertaking in 1696, and completed it in four years. This gentleman was so certain of the stability of his structure, that he declared it to be his wish to be in it "during the greatest storm that ever blew under the face of the heavens."

Mr. Winstanly was but too amply gratified in his wish for while he was there with his workmen and light-keepers, that dreadful storm began, which raged most violently on the 26th of November 1703, in the night; and of all the accounts of the kind which history furnishes us with, we have none that has exceeded this in Great Britain, or was more injurious or extensive in its devastation. The next morning, November 27th, when the violence of the storm was so much abated that it could be seen whether the light-house had suffered by it, nothing appeared standing; but, upon a nearer inspection, some of the large irons by which the work was fixed upon the rock still remain; nor were any of the people, or any of the materials of the building, ever found afterwards.

In 1709, another light-house was built of wood, on a very different construction, by Mr. John Rudyerd, then a silk mercer on Ludgate-hill. This was a very ingenious structure; after it had braved the elements for 46 years, it was burnt to the ground in 1755. On the destruction of this light-house, that excellent mechanic and engineer Mr. Smeaton, was chosen as the fittest person to build another. It was with some difficulty that he was able to persuade the proprietors, that a stone building, properly constructed, would in all respects be preferable to one of wood; but having at last convinced them, he turned his thoughts to the shape which was most suitable to a building so critically situated. Reflecting on the structure of the former buildings, it seemed a material improvement to procure, if possible, an enlargement of the base, without increasing the size of the waist, or that part of the building which is between the top of the rock, and the top of the solid work. Hence he thought a greater degree of

strength and stiffness would be gained, accompanied with less resistance to the acting power. On this occasion, the natural figure of the waist, or bole, of large spreading oak, occurred to Mr Smeaton. "Let us (says he) consider its particular figure. Connected with its roots, which lie hid below ground, it rises from the surface with a large swelling base, which at the height of one diameter is generally reduced by an elegant curve, concave to the eye, to a diameter less by at least one-third, and sometimes to half its original base. From thence, its taper diminishing more slowly, its sides by degrees come into a perpendicular, and for some height form a cylinder. After that, a preparation of more circumference becomes necessary, for the strong insertion and establishment of the principal boughs, which produces a swelling of its diameter. Now we can hardly doubt, but that every section of the tree is nearly of an equal strength in proportion to what it has to resist; and were we to lop off its principal boughs, and expose it in that state to a rapid current of water, we should find it as capable of resisting the action of the heavier fluid, when divested of the greater part of its clothing, as it was that of the lighter, when all its spreading ornaments were exposed to the fury of the wind; and hence we may derive an idea of what the proper shape of a column of the greatest stability ought to be, to resist the action of external violence, when the quantity of matter is given of which it is to be composed."

With these views, as to the proper form of the superstructure, Mr. Smeaton began the work on the 2d of April, 1757, and finished it in August 4th, 1759. The rock, which slopes towards the S. W. is cut into horizontal steps, into which are dovetailed, and united by a strong cement, Portland stone, and granite. The whole, to the height of 35 feet from the foundation, is a solid of stones, ingrafted into each other, and united by every means of additional strength. The building has four rooms, one over the other, and at the top a gallery and lantern. The stone floors are flat above, but concave beneath, and are kept from pressing against the sides of the building by a chain let into the walls. It is nearly 80 feet high, and since its completion has been assaulted by

the fury of the elements, without suffering the smallest injury.

We regret that we cannot with propriety trace out the progress of this great work, and shew with what skill and judgment this unparalleled engineer overcame the greatest difficulties; we, however, beg to recommend to our curious readers, Mr. Smeaton's own account of the Eddystone light-house, not doubting that they will be highly gratified by the perusal. According to the requisite tables, this light-house is situated in lat. 50. 8; N. long. 4. 24. W. of Greenwich; or 4. 18. 23. W. of London.—*Gallery of Nature and Art.*

THE BELL-ROCK, AND LIGHT-HOUSE.

The Bell-Rock, in the German Ocean, formerly called the Scape, and the Inchcape, is a most dangerous reef, a sunken rock, lying at the distance of 11 miles from the promontory called the Red Head, in Forfarshire. The rock itself measures about 427 feet in length, and 200 feet in breadth, and is about 12 feet under water at the ordinary height, or perpendicular rise of spring tides. This rock is one of the most dangerous, in point of situation, that is to be met with on the coast of Great Britain; for while it lies in one of the most frequented estuaries, or friths in the kingdom, it is much lower in the water than any rock on which similar buildings have been erected; and the mariner could formerly have little or no warning of his danger when in its vicinity. The Bell Rock was therefore long considered as the chief obstruction to the navigation of that important estuary, the Frith of Forth, and for ages, the want of some distinguishing mark to point out its place was lamented. This rock, or most dangerous reef, is noticed in the voyage of King James V. of Scotland; and tradition says, that the abbots of the ancient monastery of Aberbrothock succeeded in fixing a bell upon it in such a manner, that it was rung by the impulse of the sea, so as to warn mariners of their impending danger. Tradition says, that this apparatus was carried away by a Dutchman, who, to complete the story, was

afterwards lost upon the rock, with his ship and crew. The particulars of this tradition is prettily related in the subjoined poetical tale, "The Inchcape Rock."

The Bell Rock light-house, is a circular building, measuring 42 feet in diameter at the base, and 13 feet in diameter at the top. The masonry is 100 feet in height, and including the light-room, it measures about 115 feet. The ascent from the rock to the top of the solid, or lowest, 30 feet, is by means of a kind of trap-ladder, which is ascended with great celerity by the light-keepers, but forms rather a difficult path for strangers, who are generally hoisted up to the entrance-door, in a chair, by a moveable crane of a singular construction, which projects from the building. The ascent from the level of the entrance-door, is by means of a circular stair to the first apartment, containing the water, fuel, &c. From thence to the several apartments, the communication is by wooden steps. The three lower apartments of the light-house have two windows each; but the upper rooms have each four windows. The windows have all double sash-frames, glazed with plate-glass, besides a storm-shutter of timber for the defence of the glass against the sprays of the sea; for although the light-room is about 88 feet above the medium level of the tide, and is defended by a projecting cornice, or balcony, with a cast-iron rail, formed like the meshes in net-work, yet the sprays of the sea occasionally lash or fall upon the glass of the light-room, so that it becomes necessary, in gales of wind, to shut the whole of the dead lights to the windward.

The light of the Bell Rock is from oil, with Argand burners, placed on the focus of silver-plated reflectors, hollowed with a wonderful degree of accuracy, to the parabolic curve, simply by the process of hammering. These reflectors measure 24 inches over the lips; and the light is so powerful, as to be seen and readily distinguished at the distance of six or seven leagues when the atmosphere is clear.

The Bell Rock light may easily be distinguished from all others upon the coast, as it shews the natural or common bright light alternately, with a light of a red colour, tinged by the interposition of plates of glass stained red, which are placed between the observer and the reflector.

These reflectors are ranged upon a frame, with four faces or sides, two of these sides being filled up with coloured shades, while the former is made to revolve upon a perpendicular axis, by means of a train of machinery, and thereby exhibits alternately a red-coloured light, and a bright light of the natural appearance. Between these appearances, and in the course of each revolution, there are intervals of darkness, which in a very simple and beautiful manner mark out this light-house to the mariner from all others on the coast.

The same machinery is used for tolling two large bells, night and day, during the continuance of foggy weather. As these bells weigh about twelve hundred weight each, they are heard at a considerable distance, so as to alarm and give warning in thick and hazy weather to the mariner, on his approach to the rock, when the light and light-house may be hid in fog.—*Edinburgh Encyclopedia.*

THE INCHCAPE ROCK.

No stir in the air, no stir in the sea,
The ship was still as she might be;
Her sails from Heav'n receiv'd no motion,
Her keel was steady in the ocean.

Without either sign, or sound of their shock,
The waves flow'd over the Inchcape Rock;
So little they rose, so little they fell,
They did not move the Inchcape bell.

The Abbot of Aberbrothock
Had floated that bell on the Inchcape Rock;
On the waves of the storm it floated and swung
And louder, and louder, it warning rung.

Where the rock was hid by the tempest's swell,
The mariners heard the warning bell;
And then they knew the perilous rock,
And bless'd the Priest of Aberbrothock.

The sun, in Heav'n shone so gay;
All things were joyful on that day;
The sea-birds scream'd, as they sported round,
And there was pleasure in their sound.

The float of the Inchcape bell was seen,
A darker speck, on the ocean green;
Sir Ralph the Rover, walk'd his deck,
And he fix'd his eye on the darker speck.

He felt the cheering power of spring,
It made him whistle, it made him sing:
His heart was mirthful, to excess,—
But the Rover's mirth was wickedness.

His eye was on the bell and float—
Quoth he, my men, put out the boat,
And row me to the Inchcape Rock,
And I'll plague the Priest of Aberbrothock.

The boat is lower'd, the boatmen row,
And to the Inchcape Rock they go;
Sir Ralph bent over from the boat,
And cut the warning bell from the float.

Down sunk the bell, with a gurgling sound,
The bubbles rose, and burst around;
Quoth Sir Ralph, the next who comes to the Rock
Will not bless the Priest of Aberbrothock.

Sir Ralph the Rover, sailed away,
He scour'd the seas for many a day;
And now grown rich, with plunder'd store,
He steers his course to Scotland's shore.

So thick a haze o'erspreads the sky,
They could not see the sun on high;
The wind had blown a gale all day,
At evening it had died away.

On the deck the rover takes his stand,
So dark it is, they see no land;
Quoth Sir Ralph, it will be lighter soon,
For there is the dawn of the rising moon.

Canst hear, said one, the breakers roar;
For yonder, methinks, should be the shore.
Now, where we are, I cannot tell,
But I wish we could hear the Inchcape bell.

They hear no sound, the swell is strong,
Tho' the wind hath fallen, they drift along;
Till the vessel strikes with a shivering shock,—
Mercy!—it is the Inchcape Rock!

Sir Ralph the Rover tore his hair;
He curst himself in his despair;
The waves rush in on every side,
The ship is sinking beneath the tide.

But even in his dying fear
One dreadful sound could the Rover hear;
A sound as if with the Inchcape bell,
The devil below was ringing his knell

Poetical Register.

ATMOSPHERIC PHENOMENA.

WINDS, *&c.*

THE periodical return of winds from a certain quarter may be justly reckoned among the most curious phenomena of Egypt. When the sun approaches the tropic of Cancer, they shift from east to north; and in June, they invariably blow from the north or north-west. They continue northerly during the whole of July, varying only sometimes toward the east and west. In August and September, they blow directly from the north, aud are but of a moderate strength, though somewhat weaker in the night than in the day. Toward the end of September, they return to the east, though they do not absolutely fix

on that point, but blow more regularly from it than any other. As the sun approaches the southern tropic, they become more variable and tempestuous, blowing most commonly from the north and north-east, which they continue to do throughout December, January and February; and during that season, the vapours raised from the Mediterranean condense into mist, or sometimes into rain. Toward the end of February and in March, they more frequently blow from the south than from any other quarter. During part of March and in April, they blow from the south-east and south-west, and sometimes from the east, the latter becoming most prevalent about the end of the month, and continuing during the whole of May.

It is to the long continuance of the north winds, (formerly called the Etesian winds) that Egypt is supposed to owe its extreme dryness, as well as part of the inundation by which it is annually fertilized. From April to June, there appear to be two strong currents in the atmosphere, the under one blowing from the north, and the upper from the south. By the former, the vapours are raised from the Mediterranean and the southern parts of Europe, whence they are carried over Abyssinia, dissolving there in immense torrents of rain; while by the latter the superfluous vapours, or those raised from the soil of Abyssinia itself, are carried in a northerly direction toward the sources of the Euphrates. Here the clouds coming from the south, dissolve in like manner into rain, and produce an inundation of the Euphrates similar to that of the Nile, and immediately succeeding it. Mr. Bruce had an opportunity of ascertaining this fact, in the summer of 1768; for at that time, while on a voyage from Sidon to Alexandria, he observed great numbers of thin white clouds moving rapidly ffom the south, and in direct opposition to the Etesian winds.

Besides the ordinary winds above-mentioned, Egypt is infested with the pestilential blasts common to all warm countries which have deserts in their immediate vicinity. The Egyptians call them "winds of fifty days," because they commonly prevail during the fifty days preceding and following the equinox; though, if they were to blow constantly for only half that time, an universal destruction would be the consequence. They always blow from the

south, and are indisputably owing to the motion of the atmosphere over such vast tracts of hot sand, where it cannot be supplied with a sufficient quantity of moisture. When they begin to blow, the sky loses its usual serenity, and assumes a dark and alarming aspect, the sun laying aside his usual splendour, and becoming of a violet colour. This terrific appearance seems not to be occasioned by any real haze or cloud in the atmosphere, but solely by the vast quantity of sand carried along by these winds and which is so excessively subtile that it penetrates every where.

The extreme dryness of these winds is such, that water sprinkled on a floor evaporates in a few minutes; all the plants are withered and stripped of their leaves, and a fever is instantaneously produced in the human species by the suppression of perspiration. The danger is greatest when the wind blows in squalls, and to travellers who happen to be exposed to its fury without any shelter. The best method in this case is, to stop the mouth and nostrils with a handkerchief. Camels, by a natural instinct, bury their noses in the sand, and keep them there till the squall is over.

A blast of this kind once overtook Mr. Bruce in the desert of Nubia; and the pillars of moving sand, which are commonly raised by such winds, were observed on this occasion in all their terrific majesty. Sometimes they appeared to move slowly; but at other times, with such incredible swiftness, that they could not possibly have been eluded by the fleetest horse. Frequently the tops, when arrived at an immense height, suddenly separated from the bodies, and dispersed themselves in the air; and sometimes the whole column broke off near the middle, as if it had received a cannon shot: and their size was so enormous, that at the distance of about three miles, they appeared ten feet in diameter. Next day they appeared of a smaller size, but more numerous, and sometimes approached within two miles of the company. The sun was now obscured by them and the transmission of his rays gave them a dreadful appearance, resembling pillars of fire. This was said to be a certain sign of the approaching *Simoom*, or hot wind, and the guide directed, that, when it came, the travellers should fall upon their faces,

and keep their mouths on the sand, to avoid drawing in the pernicious blast with their breath. On his calling out that the Simoom was coming, Mr. Bruce turned for a moment to the quarter from whence it came, and perceived it like a fog of a purple colour, seemingly about 20 yards in breadth, and about 12 feet high from the ground. It moved with such rapidity that, before he could turn about and prostrate himself, he felt the vehement heat of its current upon his face, and even after it had passed over, the air which followed was so extremely hot as to threaten instant suffocation.

The same phenomenon occurred twice more on our traveller's journey through the desert. The second time it seemed to have a shade of blue mingled with the purple, and its edges were less perfectly defined; resembling a thin smoke, and having about a yard in the middle tinged with blue and purple. The third time, it was preceded by an appearance of sandy pillars, more magnificent than any that had yet been observed; the sun shining through them in such a manner as to give those which were nearest a resemblance of being spangled with stars of gold. The Simoom which followed had the same blue and purple appearance as before, and was succeeded by a most suffocating wind, which continued for upwards of two hours.

The danger of travelling in these sandy deserts is finely and energetically described in the tragedy of Cato:—

> "So where our wide Numidian wastes extend,
> Sudden the impetuous hurricanes descend,
> Wheel through the air, in circling eddies play,
> Tear up the sands, and sweep whole plains away.
> The helpless traveller, with wild surprise,
> Sees the dry desert all around him rise,
> And, smother'd in the dusty whirlwind, dies."

Mr. Bruce remarked, that these destructive winds always came from the south-east, while the sandy pillars which prognosticated their approach, seemed to keep to the westward, and to occupy the vast circular space enclosed by the Nile, to the west of their route, going round by Chaigie toward Dongola. The heaps of sand left by them when they fell, or raised by the whirlwinds which

carried them up, were about two feet high, exactly conical, tapering to a fine point, and their bases well proportioned. —SMITH.

PESTILENTIAL WINDS.

THE Samiel is a hot and pestilential wind, which blows over the Desert of Arabia, in the months of July and August, from the north-west quarter, and sometimes continues with unabated violence to the very gates of Bagdad, but never affects any person within the walls. Some years it does not blow at all; and, in others, it appears eight or ten times, but seldom continues more than a few minutes at a time. The Arabs and Persians have warning of its approach, by a thick haze, which appears like a cloud of dust rising out of the horizon; and upon its appearance, they prostrate themselves, with their faces close to the ground, and continue in that position till the wind has passed; but if they are not careful or active enough to take this precaution, they receive the full force of the wind, and are immediately deprived of life.

The above method is the only one which they take to avoid the effects of this fatal blast; and when it is over, they get up and look round for their companions. If they see any one lying motionless, they take hold of an arm or a leg, and pull it with great violence; and if the limb thus agitated separates from the body, it is a certain sign that the Samiel has had its full effect; but if, on the contrary, the arm or leg does not come away, it proves there is life remaining, although to every outward appearance the person is dead; and in that case they immediately cover him with clothes, and administer some warm diluting liquor, to cause a perspiration.

The Arabs themselves can say but little respecting the nature of this wind, except that it always leaves a strong sulphureous smell, and that the air at these times is perfectly clear, except about the horizon in the north-west quarter, which gives warning of its approach.

It has not been accurately ascertained, whether the dead bodies are scorched, or dissolved into a kind of gelatinous substance; but from the stories current about them, there

has been reason to believe the latter; and in that case, such fatal effects may be attributed rather to a noxious vapour than to any excessive heat. This destructive wind is so universally known in the neighbourhood of Bagdad and Bassora, that the very children speak of it with emotions of terror

Exclusive of this wind, the air of Arabia is sometimes extremely pernicious, not only to the lungs and blood, but also to the skin, which is often burnt, blistered, and stripped off, in a most surprising manner. The eyes of the Arabs are, also, so much endangered by it, that they are obliged to travel with a kind of soft black crape over them; and as this is not always a sufficient defence, they carry about them an efficacious remedy to anoint their eyes whenever they begin to be inflamed.

Mr. Thevenot relates, that in his journey from Suez to Cairo, he was annoyed with one of these hot winds, which lasted for a whole day; and that the caravan travelling to Mecca, was so infested by one, the year before, that they lost two thousand men in a single night.—SMITH'S *Wonders.*

THE DEVIL WIND.

SOME parts of India are particularly subject to a furious whirlwind, which the Mahrattas universally distinguish by the appellation of *devil*, as supposing that none but the devil can have any concern in such unwelcome visitations. Mr. Moor, lieutenant on the Bombay establishment, has given the following account of one of these destructive winds:—They may be seen at a great distance in the form of an immense column, moving irregularly, with considerable rapidity, and with a great noise; clouds of dust, and any thing light, such as pieces of paper, cloth, leaves, &c., are whirled up to a height beyond the reach of the eye, forming a column, at the base, of, perhaps, 20 or 30 feet diameter. Most of them are sufficiently violent to knock down a tent, unless well secured; and it was ludicrous to see what scenes of confusion would sometimes be occasioned when one got among the tents and huts of the Mahratta camp. It would often

beat down a habitation, and carry away the only dress of the inhabitant, who would have to run more than half naked in pursuit of it. Sometimes, by dispersing fire, it would burn the huts and tents; and, as it prevailed most in the heat of the day, our kitchens and dinners often suffered from its intrusion. On the first appearance of this phenomenon, every body began to shout and abuse it; so that, with the noise of the *devil* itself, and that of its abuse, good warning was generally given of its approach. —SMITH'S *Wonders*.

FIERY WHIRLWIND.

SOME of Lord Lovell's ploughmen, being at work, at Holkham, Norfolk, about the middle of August, 1741, on a fair-day, at ten o'clock in the morning, saw on a heath about a quarter of a mile from them, a wind like a whirlwind, come gradually toward them, in a straight line from east to west. It passed through the field where they were at plough, tore up the stubble and grass in the ploughed ground, for two miles in length and thirty yards in breadth. When it came to some closes at the top of a rising ground, some men there saw it appear like a great flash or ball of fire. To some others it appeared as a fire, and some saw only a smoke, and heard such a noise as fire makes when a barn is burning, and the wind making a terrible noise, like that of a violent fire, or like carts over a stony ground, which passed by a house, tearing up the stones in the road; it tore up a rank of pales, sprung several of the posts out of their places, and carried a pewter plate that stood on the outside of the window, about 40 yards from the house; also a large box-cover, about an inch and a half thick, and four feet square, and cross-barred, was carried away much farther, and torn all to pieces; and the gravel and stones flew about like feathers, It also broke down some fences, and frightened the cattle. And, what is very remarkable, every where else but in this place, the weather was clear and fine, and no sign of any storm or disturbance whatever. There was a strong smell of sulphur, both before and after the wind

passed, and the noise was heard a great while after seeing the smoke. They said it moved so slowly forward, as to be near ten minutes in coming from the closes to the house. —*Philosophical Transactions*, 1742.

SAND WAVES OF THE DESERTS OF AFRICA.

The country presented no change from that which we passed yesterday. The sandy plain into which we had come, may with truth be called a little Sahara; the wind is there of a surprising rapidity, and the sand so extremely fine, that it forms on the ground some waves, which look like those of the sea. These waves rise up so fast, that in a very few hours a hill of about 20 or 30 feet high is transported from one place to another. I never thought it possible, and did not believe it till I was convinced of it by my own eyes. This transportation of these hills, however, does not take place all of a sudden, as is generally believed, and is by no means capable of surprising and burying a caravan which is on the march. It is easy to describe the manner in which this transposition of the hills takes place; the wind sweeping continually from the surface the sand with an astonishing rapidity, the surface of the ground lowers every moment: but the quantity of sand in the air increasing as quickly by successive waves, cannot support itself there, but falls in heaps, and forms a new hill, and the place which it occupied before is level, and looks as if it had been swept. It is necessary to guard the eyes and mouth against the quantity of sand which is always flying about in the air.

The immensity, the swiftness, and the everlasting motion of these waves, disturb the sight both of men and beasts, so that they are almost continually marching as if in the dark. The camel gives here a proof of his great superiority; his long neck, perpendicularly erected, removes his head from the ground, and from the thick part of the waves; his eyes are well defended by thick eye-lids, largely provided with hair, and which he keeps half shut; the construction of his feet, broad and cushion-like, prevents his treading deep into the sand; his long

legs enable him to pass the same space with only half the number of steps of any other animal, and therefore with less fatigue. These advantages give him a solid and easy gait on a ground where all other animals walk with slow, short, and uncertain steps, and in a tottering manner. Hence the camel, intended by nature for these journeys, affords a new motive of praise to the Creator, who, in his wisdom, has given the camel to the African, as the reindeer to the Laplander.

The shock of the waves is so great, that even at times of the most perfect calm, and without any preceding storm, and when the surface of the sea is entirely quiet at a distance, the shore is nevertheless so forcibly beaten by the surge, that mountains of foam from 50 to 60 feet high, arise not only upon the rocks, but also on the sandy flats —ALI-BEY'S *Travels in Morocco.*

PHENOMENON OF SAND.

A SINGULAR phenomenon engrossed all our attention, (says Dr. Clarke). One of those immense columns of sand, mentioned by Bruce, came rapidly towards us, turning upon its base as upon a pivot; it crossed the Nile so near us, that the whirlwind by which it was carried, placed our vessel on its beam-ends, bearing its large sail quite into the water, and nearly upsetting the boat. As we were engaged in righting the vessel, the column disappeared. It is not probable that those columns fall suddenly upon any particular spot, so as to be capable of overwhelming an army or a caravan; but that, as the sand, thus driven, is gradually accumulated, it becomes gradually dispersed, and, the column diminishing in its progress, at length disappears. A great quantity of sand is no doubt precipitated as the effect which gathers it becomes weaker; but, from witnessing such phenomena upon a smaller scale, it does not seem likely that the whole body of the sand is at once abandoned.—DR. CLARKE'S *Travels in Europe, Asia, &c.*

WHIRLWIND AT PARSON'S GREEN.

At Lord Peterborough's, at Parson's Green, July 12, 1762, just as the gardeners had left work to go to dinner, a whirlwind came, and took up seven of the bell-glasses into the air, above 20 feet; one of them went over the garden-wall into the King's-road, and nearly fell upon a man's head passing; three others were blown upon the hot-house: what is remarkable, there being several rows of glasses, the seventh was blown up, but none of the others were stirred.—*Annual Register*, 1762.

WHIRLWIND AT ANDERLICHT.

August 2, 1763, about six in the evening, there arose at Anderlicht, about a league from Brussels, a conflict of several winds, borne upon a thick fog. This conflict lasted four or five minutes, and was attended with a frightful hissing noise, which could be compared to nothing but the yellings of an infinite number of wild beasts. The clouds then opening discovered a kind of very bright lightning, and in an instant the roofs of one side of the houses were carried off, and dispersed at a distance; above 1,000 large trees were broken off near the ground, others towards the top, and others torn up by the roots, and many both of the branches and of the tops, carried to the distance of 100 paces; whole coppices were laid on one side, as corn is by an ordinary wind. The glass of the windows which were most exposed, was shivered to pieces. A tent in a gentleman's garden was carried 4,000 paces; and a branch torn from a large tree struck a girl on the forehead, as she was coming into town, and killed her on the spot. Some days before, there was a heavy rain, which overflowed in the same direction the very space of ground the whirlwind ravaged.—*Annual Register*, 1763.

WATER-SPOUTS.

Water-spout observed in the Mediterranean, by Alexander Stuart.—August 27, 1701, being on the coast of Barbary, to the northward of the town of Bona, upwards of ten leagues distance at sea, about seven o'clock at night, soon after sun-set, there appeared in the north-east, which was directly up the Gulf of Lyons from us, great and continued flashes of lightning, one after another with hardly any intermission, and this without thunder; it continued till the next morning, the flashes of lightning sometimes representing the sudden appearance of a star, and at other times of a flaming sword, and again of a silver cord stretched along the clouds, or as the irregular rents of a phial from top to bottom. About eight next morning, we had thundering, with a continuation of lightning of the kind and appearance as before, all from the north-east, or nearly so.

About nine the same morning, there fell down from the clouds, which looked black, lowering, and, as it were, heavy with rain, in the north-east, three water-spouts; that in the middle, being the greatest, seemed as large as the mast of a ship, and I judged it to be at least a league and a half distant from us—so that in itself it was, doubtless, larger than three masts: the other two were not half the size. All of them were black, like the cloud from whence they fell—and smooth, without any knot or irregularity; only at first falling, some fell perpendicularly down, and some obliquely, and all of them smaller at the lower end than above, representing a sword; sometimes, also, one of them would bend, and become straight again, and also sometimes become smaller, and again increase its bulk; sometimes it would disappear, and immediately fall down again; at other times it became extenuated to the smallness of a rope, and again became as gross as before.

There was always a great boiling, and flying up of the sea, as in a *jet d'eau*, or water-work; or this rising of the water had the appearance of a chimney smoking in a calm day. Some yards above the surface of the sea, the water stood like a pillar, and then spread itself, and was dissipated like smoke; and the sword-like spout from the

clouds either came down to the very middle of this pillar, as if it had been joined with it, as the largest pillar, which fell perpendicularly down, always did from the beginning to the end; or else it pointed to this column of water, at some distance, either in a perpendicular or oblique line, as did the two other lesser ones. There were three or four spouts more, which appeared at the same time in the same quarter of the heavens; but not like the three former either for bulk or duration. These last appeared and disappeared several times during the continuance of those three aforesaid.

It was hardly distinguishable whether the sword-like spout fell down from the cloud, or the pillar of water rose first from the sea, both appearing opposite to each other all of a sudden; only I observed of one of them, that the water boiled up from the sea to a great height, without the least appearance of a spout pointing to it, either perpendicularly or obliquely; and here the water of the sea never came together in the form of a pillar, but rose up scatteredly, the sea boiling furiously round the place. The wind being then north-east, the said boiling advanced towards the south-west, as a flitting or moving bush on the surface of the sea, and at last ceased. This shows that this boiling, or flying up of the water of the sea, may begin before the spout of the cloud appears; and, indeed, if there be any small matter of priority between these two appearances, the boiling or throwing up of the sea has it, which first begins to boil, and then forms itself into a pillar of water, especially on the lower part.

It was observable of all of them, but chiefly of the large pillar, that, towards the end, it began to appear like a hollow canal, only black in the borders, and white in the middle; and, though at first it was altogether black and opaque, yet one could very distinctly perceive the sea-water to fly up along the middle of this canal, as smoke does up a chimney, and that with great swiftness, and a very perceptible motion; and then soon after the spout or canal burst in the middle, and disappeared by little and little. The boiling up and the pillar-like form of the sea-water continuing always the last, even for some considerable time after the spout disappeared, and perhaps till the spout appeared again, or re-formed itself, which it

commonly did in the same place as before, breaking and forming itself again several times in a quarter or half an hour.

I know not if any one has accounted for this phenomenon; but I imagine it may be solved by suction, or rather pulsion, as in the application of a cupping-glass to the flesh, after the air is first exhausted by the kindled flame.

It was further observable, that the oblique spouts pointed always from the wind; that is, that the wind being at north-east, the oblique spouts always pointed to the south-west, though at the same time there were others perpendicular, which still continued so notwithstanding the wind. Also, that such as were curved, had always the convex side from the wind, and the concave towards it; that is, the wind being at north-east, the concave was towards the north-east, and the convex was towards the south-west. It rained a great deal during the continuance of these spouts; and, after their total disappearance, there was half an hour's violent storm from the north-east with very little rain; but afterwards the weather cleared up.—*Philosophical Transactions*, 1702.

WATER-SPOUT IN ENGLAND.

A PHENOMENON of this kind, so rare in England, was experienced on the 2d of May, 1815, when the rural village of Addington, in Surrey, was visited by a most dreadful storm. It commenced at twelve o'clock, and raged with unabated fury till six in the evening, during which time rain and hail-stones (the latter as big as marbles) fell in torrents, accompanied by thunder and lightning. A short time after the storm began, the water poured down from the Addington hills with great force, inundating the lands of a Mr. Ibbotson, a farmer, from whose barn a large quantity of wheat in the straw was completely swept away, and the flood, continuing its course through the farm-yard, carried every thing before it: a cow, nine pigs, and a great quantity of poultry, were drowned. The dwelling-house of Mr. I. was inundated so rapidly, that in less than ten minutes the water was four feet high. The Cricketers' public-house was flooded, the cellar blew

up, and the casks, &c., floated for two miles' distance. Addington church-wall was washed down, the graves sunk, and a great part of the Archbishop of Canterbury's garden-wall (about 12 feet high) was also swept away by the current, and large portions of the wall forced forty yards up the garden, which was so inundated and damaged, that great part of it might be compared to a clay-field. The villages for miles round were completely under water; some of the hail-stones were to be seen on the following day. Numerous poor cottagers suffered severely, but happily no lives were lost. A woman, who had clung, with her child, to the top of a beam in one of the barns, was nearly drowned at the moment the waters began to subside. Thirteen horses in a stable, which were immersed to their heads, were saved.

A REMARKABLE ECLIPSE.

As total solar eclipses are by no means common, we shall give an interesting description of one by Dr. Stukely, sent to his friend, the celebrated Dr. Edmund Halley, which took place May 22nd, 1724.

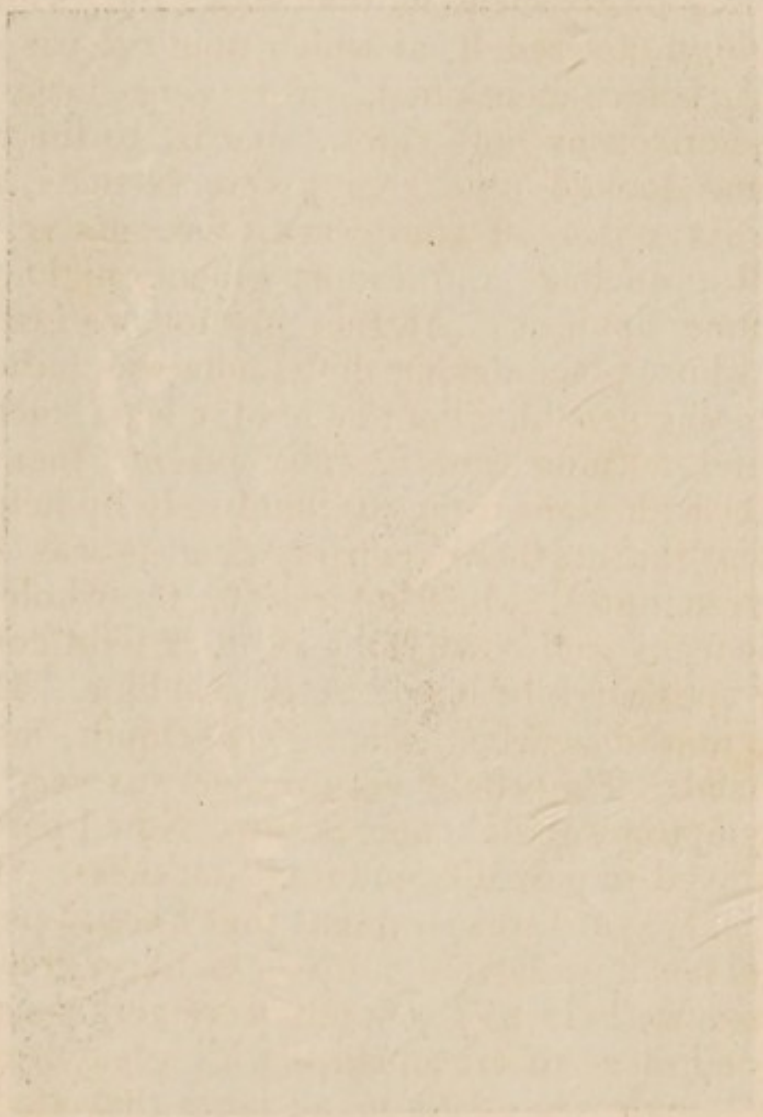
According to my promise, I send you what I observed of the solar eclipse, and proposed to myself only to watch the appearances that nature would present to the naked eye upon so remarkable an occasion, and which generally are overlooked, or but rarely regarded.

I chose for my situation Haradon Hill, near Amsbury, and full east from Stonehenge Avenue. Before me lay the vast plain on which that celebrated work stands, this being the highest hill hereabouts, and nearest the middle of the shadow. About twenty miles west of me lay Clay-Hill, which rises pretty high above the horizon, and, being near the central line of darkness, afforded sufficient notice of its approach.

Having two men in company, looking through smoked glasses, though the day was cloudy, yet we had some gleams of sunshine, we soon perceived that the eclipse was begun, when by my watch I found it half an hour after five, p. m.; and accordingly from thence the progress of it was visible, and very often to the naked eye, the thin

clouds doing the office of glasses. From the time of the sun's body being half covered, there was a very conspicuous circular iris around the sun with perfect colours. On all sides, we beheld the shepherds hurrying their flocks into the folds, the darkness coming on, for they expected nothing less than a total eclipse for an hour and a quarter.

When the sun looked very sharp, like a new moon, the sky was pretty clear in that spot; but, soon after, a thicker cloud covered it, at which time the iris vanished. Clay-Hill, before-mentioned, grew very dark, together with the horizon on both sides; that is, to the north and south, and looked blue. In a few seconds, Salisbury steeple, six miles off southward, became very black; Clay-Hill quite lost, and a most gloomy night with full career came upon us. At this instant we lost sight of the sun, whose place among the clouds was hitherto sufficiently distinguishable; but now not the least trace of it was to be found, no more than if really absent: then I saw by my watch, with some difficulty, and only by help of some light from the northern quarter, that it was six hours thirty-five minutes. Just before this, the whole compass of the heavens and earth looked of a livid complexion, properly speaking, for it was black and blue. There was, likewise in the heavens, among the clouds, much green interspersed. The whole appearance was very dreadful, and as symptoms of sickening nature. Now I perceived we were involved in palpable and total darkness. Though it came quickly, yet I was so intent that I could perceive its steps, and feel it, as it were, drop on us like a great mantle! The horses we held in our hands were very sensible of it, and drawed close to us, starting with great surprise; as much as I could see of the men's faces that stood by me, they had a horrible aspect. At this instant I looked around me, not without exclamation of admiration, and could discern colours in the heavens, but the earth had lost its blue, and was wholly black. For some time, among the clouds, there were visible streaks of rays tending to the place of the sun as their centre; but immediately after the whole appearance of the earth and sky was entirely black. Of all things I ever saw in my life, or can by imagination fancy, it was a sight the most tremendous.



THE COMET OF 1809.

All the change I could perceive during the totality was, that the horizon, by degrees, drew into parts, light and dark; the northern hemisphere growing still longer, lighter, and broader—and the two opposite dark parts uniting into one, and swallowing up the southern enlightened part.

At length, upon the first lucid point appearing in the heavens where the sun was, I could distinguish pretty plainly a rim of light running alongside of us a good while together, or sweeping by our elbows west to east. Just then, having good reason to suppose that the totality ended with us, I looked on my watch, and found it to be full three minutes and a half more. Now the hill-tops changed their black into blue again; immediately we heard the larks chirping and singing very briskly for joy of the restored luminary, after all nature had been hushed into a most profound and universal silence. The heavens and the earth now appeared like morning before sun-rise, of a greyish cast, but rather more blue interspersed; and the earth, so far as the verge of the hill reached, was of a dark green or russet colour. After about the middle of the totality, and so after the emersion of the sun, we saw Venus very plainly, but no other star. The cloudiness of the day added much to the solemnity of the eclipse, which incomparably exceeded, in my apprehension, that of 1715, which I saw very perfeetly from the top of Boston steeple in Lincolnshire, where the air was very clear.—*Time's Telescope.*

COMETS.

Comets, according to Sir Isaac Newton, are compact, solid, fixed, and durable bodies:—in one word, a kind of planets, which move in very oblique and eccentric elliptical orbits, every way with the greatest freedom; persevering in their motions even against the course and direction of the planets; and their tail is a very thin slender vapour emitted by the head or nucleus of the comet, ignited or heated by the sun

From the lights which this great philosopher has thrown upon this abstruse part of astronomy, there is reason to hope that succeeding astronomers will carry it to the greatest degree of perfection. But although we are indebted to him for a true theory of the *motion* of comets, yet with respect to the formation of their *tails*, and the *uses* for which these great bodies are intended, his opinions have been controverted. Dr. Hamilton, in particular, in his Philosophical Essays, controverts Sir Isaac's opinion. He asserts, from a view of the phenomena of a comet, that the matter which constitutes its tail, is not an illuminated vapour, but a *self-shining substance*, which, in all positions of the comet, and whatever be the direction of its motion, whether toward or from the sun, is thrown off from its dark hemisphere, in a direction opposite to the sun, a short time before and after its perihelion or nearest approach to that luminary. He finds, moreover, in the Aurora Borealis, a matter which greatly resembles it in appearance, its situation with regard to the sun and to the body whence it flows, as well as in the nature of its substance, so far as it is known to us; for the Aurora Borealis, is likewise a rare and lucid substance, thrown off in a direction nearly opposite to the sun, from the dark hemisphere of the earth; tending toward the zenith of the spectator, or the *vertex* of the earth's shadow; rising principally from the northern part of the earth's atmosphere, and most frequently visible while the sun is passing through the southern signs, and the earth moving from the autumnal to the vernal equinox, through that half of its orbit which is nearest to the sun; and, lastly, not intercepting, in any sensible degree, the light of the fixed stars, so that to a spectator placed at a considerable distance from the earth, and shaded from the sun's light, it must appear as a tail to the earth, small, indeed, in proportion to the earth's diameter, but in its direction, situation, transparency, and lucid appearance, resembling that of a comet's. We shall conclude this wonderful subject, with the following moral reflections of an elegant writer:

"I cannot forbear reflecting on the insignificance of human art, when set in comparison with the designs of Providence. In the pursuit of this thought, I considered a comet, or, in the language of the vulgar, a blazing star,

as a sky-rocket discharged by a hand that is almighty. Many of my readers saw that in the year 1680; and, if they are not mathematicians, will be amazed to hear, that it travelled with a much greater degree of swiftness than a cannon-ball, and drew after it a tail of fire that was four-score millions of miles in length. What an amazing thought is it to consider this stupendous body traversing the immensity of the creation with such a rapidity, and, at the same time, wheeling about in that line which the Almighty had prescribed for it! That it should move with such inconceivable fury and combustion, and, at the same time, with such an exact regularity! How spacicus must the universe be, that gives such bodies as these their full play, without suffering the least disorder or confusion by it! What a glorious show are those beings entertained with, that can look into this theatre of nature, and see myriads of such tremendous objects, wandering through those immeasurable depths of ether, and running their appointed courses! Our eyes may, hereafter, be strong enough to command this magnificent prospect, and our understandings able to find out the several uses of these great parts of the universe. In the mean time they are very proper objects for our imagination to contemplate, that we may form more extensive notions of infinite wisdom and power, and learn to think humbly of ourselves, and of all the works of human invention."—*Guardian*, No. 103.

THERE are three comets which have been much celebrated, *viz.*, that which appeared in 1680, just mentioned, and those of 1744 and 1759. The comet of 1680 was remarkable for its near approach to the sun; so near, that in its perihelion it was not above a third part of the diameter of that luminary from the surface thereof. Its great heat in that position was computed to be 2,000 times hotter than iron at its white heat; of course, it must have been entirely dissipated if it had been any other than a fixed and solid body. It must also have retained its heat an immense time; for a globe of iron, of an inch in diameter, exposed to the open air, scarcely loses its heat in less than an hour, but a larger globe will retain its heat longer

in proportion to its diameter, because the surface at which it grows cold varies in that proportion less than the quantity of hot matter. Therefore, a globe of red-hot iron, as big as our earth, would scarcely cool in 50,000 years. The period of this comet has been calculated at 525 years: and, if the computation be accurate, it will not return to the vicinity of the earth till about the year 2225. This comet, at its greatest distance, is about 11,200 millions of miles from the sun, and its least distance is not more than 49,000 miles. In that part of its orbit which was nearest the sun, it was computed to move at the rate of 880,000 miles in an hour.

Very remarkable comets appeared in the year 1807, 1808, and 1811, but the nature and limits of this work forbid us from entering into a detailed description of them. The comet which appeared in the summer of 1809 is thus briefly described from ocular observation:

This late brilliant stranger appears to have made its appearance within the limits of our optical powers rather unexpectedly; at least, we are unacquainted with any predictions of its arrival in those lower regions of space; and this is confirmed by the dissimilarity in the elements of its orbit, and those of the comets that had been previously computed. But though its visit was not only unexpected but transient, the interest it excited was general and lively. This comet appears to have been first seen at Palermo, by the celebrated astronomer Piazzi, who announced its appearance to the Duchess de Berri. It was soon afterwards seen at Paris; at both of which places the air is often more clear and suitable for astronomical observations than in England. It is said to have been first seen at both York and Leeds on the 1st of July, and when at its lowest depression below the north pole, it was only a few degrees above the horizon; but it does not appear to have been observed in the neighbourhood of the metropolis till the 3d of that month. On that evening, however, its brilliancy was sufficient to render it visible to the naked eye, soon after the stars began to appear in the evening. Of this the writer was himself a witness, a very few miles north of London; and thus it continued till the morning caused it to be hid from our observation. Its nucleus appeared to be well defined,

and its tail extended several degrees towards the zenith, and, when seen through a good telescope, seemed to have a slightly curling divergency towards the extremity. The length of the tail was estimated by some observers at fifteen degrees. The use of the comet's huge vapoury train, is in the words of Thomson,

> " Perhaps to shake
> Reviving moisture on the numerous orbs
> Thro' which his long ellipsis winds; perhaps
> To lend new fuel to declining suns,
> To light up worlds, and feed the eternal fire."
>
> *Contemplative Philosopher, Time's Telescope, &c*

The following lines were written on the comet which appeared so beautifully conspicuous in the Autumn of 1807 :

Illustrious visitant! And art thou come
From paths where faintly gleams our solar ray,
Some image of the glories to convey,
Awaiting man in his eternal home!
Where neither storms approach, nor clouds, nor gloom.
But smiles invested with unfading day,
The pure expanse of ether; bright as play
The splendours, woven in Heaven's radiant loom,
Of thy soft beaming train! We think not now,
As superstition erst, with troubled brow;
Nor view thee, with transcendent beauty endued,
As pestilence portending, famine, blood:
But rather deem an orb so fair as thou
To us and other worlds dispenses vital good.

THE RAINBOW.

Refracted from yon eastern cloud,
Bestriding earth, the grand ethereal bow
Shoots up immense; and every hue unfolds
In fair proportion, running from the red
To where the violet fades into the sky.—THOMSON.

THE rainbow is a circular image of the sun, variously coloured, and is thus produced: The solar rays, entering the drops of falling rain, are refracted to their further surfaces, and thence, by one or more reflections, transmitted to the eye; at their emergence from the drop, as well as at their entrance, they suffer a refraction, by which the rays are separated into their different colours, which consequently are most beautifully exhibited to an eye properly placed to receive them.

Sometimes, (though rarely,) two, and even three rainbows are seen; the colours in the bow are thus disposed, *viz.*, violet, purple, blue, green, yellow, orange, red. After a long drought, the bow is a certain sign of rain; if after much wet, fair weather; if the green be large and bright, it is a sign of rain, but if the red be the strongest colour, then it denotes wind and rain together. If the bow breaks up all at once, there will follow serene and settled weather; if the bow be seen in the morning, small rain will follow; if at noon, settled and heavy rains; if at night, fair weather. The appearance of two or three rainbows shews fair weather for the present, but settled and heavy rains, in two or three days' time.—*Shepherd of Banbury's Rules.*

LUNAR RAINBOWS.

THE moon sometimes exhibits the phenomenon of a rainbow, by the refraction of her rays in drops of rain in the night-time. Lunar rainbows very seldom present themselves to our observation: they are extremely beautiful, though much less than those that appear in the day-

time, and a yellow or rather straw-colour chiefly prevails. As they are of such rare occurrence, they cannot well be reckoned among the signs of the weather, consequently no probable rules for ascertaining the weather can be deduced from the appearance of such rain-bows.—*Shepherd of Banbury's Rules.*

ATMOSPHERIC DECEPTIONS.

PARHELIA, OR MOCK SUNS.

In the *Philosophical Transactions* for 1733, the Reverend Mr. Whiston gives the following description of this remarkable phenomenon.

About 10 o'clock in the morning, October 22d, 1721, being at the house of Samuel Barker, Esq., of Lyndon, in the county of Rutland, after an Aurora Borealis the night before, wind W. S.W., I saw an attempt towards two mock suns, as I had done formerly. About half, or three quarters of an hour after, I found the appearance complete; when two plain parhelia, or mock suns, appeared tolerably bright and distinct; and that in the usual places, *viz.*, in the two intersections of a strong and large portion of a halo, with an imaginary circle, parallel to the horizon, passing through the true sun. This circle I call imaginary, because it was not itself visible, as it sometimes has been at such appearances. Each parhelion had its tail of a white colour, and in direct opposition to the true sun; that towards the east was 20 or 25° long, that towards the west about ten or twelve degrees, but both narrowest at the remote ends. The mock suns were evidently red towards the sun, but pale or whitish at the opposite sides, as was the halo also. Looking upward, we saw an arc of a curiously inverted rainbow, about the middle of the distance between the top of the halo and the vertex. This arc was as distinct in its colours as the common rainbow, and of the same breadth. The red colour was on the convex, and the blue on the concave of the arc, which seemed to be about 90° long, its centre in or near the vertex. On the top of

the halo was a kind of inverted bright arc, though its bend was not plain. The lower part of the halo was among the vapours of the horizon, and not visible. The angles, as more exactly measured on Monday near noon, when the same appearance returned again, but more faintly, were as follow. The sun's altitude $22\frac{1}{3}°$; perpendicular semidiameter of the halo $23\frac{1}{3}$; distance of the rainbow from the top of the halo $23\frac{1}{2}$; semidiameter of the arc of the rainbow, if our vertex be supposed its centre, 21°. The phenomenon lasted each day for an hour and a half, or two hours. What was most remarkable on Monday was, that the wind, which on Sunday had been almost insensible was now become sensible, and changed to N.N.E that the halo was sensibly become oval, its shorter axis parallel to the horizon; and the two mock suns, which were then but just visible, especially that on the east, were not in the halo, but a degree or two without it, which I ascribe to the unusual shortness of the horizontal diameter, which position of the mock suns does not appear to have been hitherto taken notice of by any, though it was now very sensible.

October the 26th, about nine in the morning, as I was coming in the Northampton coach towards London, the halo returned larger and clearer than before, and the two mock suns just attempted an appearance, as on Sunday; but the air becoming thicker and thicker towards rain, I saw no more. I add nothing to this account, but only that, August 30th before, I saw at the same place, (Rutland,) a remarkable halo, whose upper part had its inverted arc reddish within, and pale without, but brighter and more vivid than ever I saw before.—*Philosophical Transactions.*

Glory, seen on Mount Rheall, near the Vale of Clywyd. By JOHN HAYGARTH, F.R.S., *&c.*—On the 13th of February, 1780, (says this gentleman,) as I was returning to Chester, and ascending, at Rheall, the mountain which forms the eastern boundary of the Vale of Clywyd, I observed a rare and curious phenomenon.

In the road above me, I was struck with the peculiar appearance of a very white shining cloud, that lay remarkably close to the ground. The sun was nearly setting

but shone extremely bright; I walked up to the cloud, and my shadow was projected into it. The head of my shadow was surrounded at some distance by a circle of various colours, whose centre appeared to be near the situation of the eye, and whose circumference extended to the shoulders. This circle was complete, except what the shadow of my body intercepted. It exhibited the most vivid colours, red being outermost; as far as can be recollected, all the colours appeared in the same order and proportion that the rainbow presents to our view. It resembled very exactly what in pictures is termed *a Glory* around the head of our Saviour, and of saints, not indeed that luminous radiance, which is painted close to the head, but an arch of concentric colours, which is placed separate and distinct from it. As I walked forward, this glory approached or retired, just as the inequality of the ground shortened or lengthened my shadow. The cloud being sometimes in a small valley below me, sometimes on the same level, or on higher ground, the variation of the shadow and glory became extremely striking and singular.

To add to the beauty of the scene, there appeared, at a considerable distance, to the right and left, the arches of a white shining bow. These arches were in the form of, and broader than a rainbow, but were not completely joined into a semicircle above, on account of the shallowness of the cloud. When my chaise came up, I could observe no peculiar appearance round the shadows of the postilion, horses, or chaise. But the postilion was alarmed to an uncommon degree by this very singular apparition, which, indeed, might excite terror or delight in the beholder, according to the disposition of mind with which it was viewed.

Several appearances have been described by philosophers, in some respects resembling what I saw, but not exactly the same. The arch, in size, situation, and colour, was most exactly the glory represented in some pictures, and is manifestly the archetype whence it had been copied by a painter. Indeed such a phenomenon is well adapted to excite religious awe and veneration.

When I returned into the chaise, a bright radiance appeared close to its shadow, but no separate coloured circle was formed.

In order to investigate the cause of these curious ap-

pearances, on optical principles, it may be useful to note some peculiar circumstances. The cloud was specifically heavier than the air of that region where it was placed; for, it descended, with considerable velocity down the side of the mountain. It was very close and shallow, being, in part, compressed by its own weight: the air at that altitude being too rare to suspend it.—*Gallery of Nature and Art.*

REFLECTION OF A MAN IN THE AIR.

On the 27th of August, 1814, while the Majestic, Captain Hayes, was cruising off Boston, a strange figure was perceived in the eastern horizon, about two o'clock in the morning; which, as the sun arose, gradually became more distinguishable, and, at length, assumed the perfect appearance of a man, dressed in a short jacket and half-boots, with a staff in his hand, at the top of which was a colour hanging over his head, marked with two lines, perpendicularly drawn at equal distances, and strongly resembling the French flag. The figure continued visible as long as the rays of the sun would permit it to be looked at. On the 28th, the figure displayed itself in the same posture, but rather broken. On the following morning, it seemed entirely disjointed, and faded into shadow, until, at last, nothing more could be seen than three marks on the sun's disk. Captain Hayes, his officers, and about two hundred of the crew, witnessed the spectacle, both with the naked eye and through glasses. In superstitious times, such a phenomenon would have been construed into a providential warning, or ominous token of some unexpected event; in this enlightened age, however, it may be easily accounted for by the reflective power of the atmosphere, which is well known to be wonderful. Most probably, the figure represented was some one on shore, or on the deck of the Majestic.—*Courier, June* 13, 1815.

ATMOSPHERICAL REFRACTION.

The Coast of Picardy, brought apparently close to that of Hastings.—July 26, 1798, about five o'clock in the

afternoon, while sitting in my dining-room, at Hastings, (observes Mr. Latham,) which is situated on the Parade, close to the sea-shore, nearly fronting the south, my attention was excited by a great number of people running down to the sea-side. On inquiring the reason, I was informed, that the coast of France was plainly to be distinguished with the naked eye. I immediately went down to the shore, and was surprised to find that, even without the assistance of a telescope, I could very plainly see the cliffs on the opposite coast; which, at the nearest part, are between 40 and 50 miles distant, and are not to be discerned, from that low situation, by the aid of the best glasses. They appeared to be only a few miles off, and seemed to extend for some leagues along the coast. I pursued my walk along the shore to the eastward, close to the water's-edge, conversing with the sailors and fishermen on the subject. At first they could not be persuaded of the reality of the appearance; but they soon became so thoroughly convinced, by the cliffs gradually appearing more elevated, and approaching nearer, as it were, that they pointed out, and named to me, the different places they had been accustomed to visit; such as, the Bay, the Old Head or Man, the Windmill, &c., at Boulogne; St. Vallery, and other places on the coast of Picardy; which they afterwards confirmed, when they viewed them through two telescopes..

Their observations were, that the places appeared as near as if they were sailing, at a small distance, into the harbour.

Having indulged my curiosity on the shore for near an hour, during which the cliffs appeared to be sometimes more bright and near, at others more faint and at a greater distance, but never out of sight, I went on the eastern cliff or hill, which is of a very considerable height, when a most beautiful scene presented itself to my view; for I could at once see Dungeness, Dover Cliffs, and the French coast, all along from Calais, Boulogne, &c., to St. Vallery; and, as some of the fishermen affirmed, as far to the westward even as Dieppe. By the telescope, the French fishing-boats were plainly to be seen at anchor; and the different colours of the land on the heights, with the buildings, were perfectly discernible.

This curious phenomenon continued in the highest splendour till past eight o'clock, though a black cloud totally obscured the face of the sun for some time, when it gradually vanished. I was assured, from every inquiry I could make, that so remarkable an instance of atmospherical refraction had never been witnessed by the oldest inhabitant of Hastings, nor by any of the numerous visitors that come to the great annual fair. The day was extremely hot. I had no barometer with me, but suppose the mercury must have been high, as that and the three preceding days were remarkably fine and clear. To the best of my recollection, it was high water at Hastings about two o'clock, P. M. Not a breath of wind was stirring the whole day; but the small pennons at the mast-heads of the fishing-boats in the harbour, were in the morning at all points of the compass.

I was a few days afterwards at Winchelsea, and at several places along the coast, where I was informed, the above phenomenon had been equally visible. When I was on the eastern hill, the cape of land called Dungeness, which extends nearly two miles into the sea, and is about 16 miles distant from Hastings, in a right line, appeared as if quite close to it: as did the fishing-boats and other vessels, which were sailing between the two places; they were likewise magnified to a great degree.—*Philosophical Transactions*, 1798.

AURORA BOREALIS.

——————— Silent from the north
A blaze of meteors shoots: ensweeping first
The lower skies, they all at once converge
High to the crown of heaven, and all at once,
Relapsing quick, as quickly reascend,
And mix, and thwart, extinguish, and renew,
All ether coursing in a maze of light.—THOMSON.

THE Aurora Borealis, or Northern Lights, is a kind of meteor appearing in the northern part of the heavens, mostly in the winter-time, and in frosty weather. It is now so generally known, that no description is requisite of the appearance which it usually makes in this

country. But it is in the arctic regions that it appears to perfection, particularly during the solstice. In England, the extremities only of these northern lights are to be seen, so that we have but a faint idea of their splendour and their motions. According to the state of the atmosphere, they differ in colours. They often assume the colour of blood, and make a very dreadful appearance. The rustic sages become prophetic, and terrify the gazing spectators with a dread of war, pestilence, and famine. This superstition was not peculiar to the northern islands; nor are these appearances of recent date. The ancients call them *chasmata*, *trabes*, and *bolides*, according to their forms or colours. But, in old times, they were extremely rare, and, on that account, were the more taken notice of From the days of Plutarch to those of our sage historian, Sir Richard Baker, they were supposed to be portentous of great events, and timid imaginations shaped them into aërial conflicts.

From look to look, contagious through the crowd,
The panic runs, and into wondrous shapes
Th' appearance throws: Armies in meet array,
Thronged with aërial spears and steeds of fire;
Till the long lines of full-extended war
In bleeding fight commixt, the sanguine flood
Rolls a broad slaughter o'er the plains of heaven.
As thus they scan the visionary scene,
On all sides swells the superstitious din,
Incontinent; and busy Frenzy talks
Of blood and battle; cities overturned,
And late at night in swelling earthquake sunk;
Or hideous wrapt in fierce ascending flame;
Of sallow famine, inundation, storm;
Of pestilence, and every great distress,
Empires subversed, when ruling Fate has struck
Th' unalterable hour; e'en Nature's self
Is deem'd to totter on the brink of time.
Not so the man of philosophic eye,
And inspect sage; the waving brightness he
Curious surveys, inquisitive to know
The causes, and materials, yet unfixed,
Of this appearance beautiful and new.—THOMSON.

In Siberia, there is one species of the Aurora Borealis, which regularly appears between the north-east and east, like a luminous rainbow, with numbers of columns of light radiating from it. Beneath the arch is a darkness, through which the stars appear with some brilliancy. This species is thought by the natives to be a forerunner of storms. There is another kind, which begins with certain insulated rays, from the north, and others from the north-east. They augment little by little, till they fill the whole sky, and form a splendour of colours rich as gold, rubies, and emeralds; but the attendant phenomena strike the beholders with horror; for they crackle, sparkle, hiss, make a whistling sound, and a noise even equal to artificial fire-works. The idea of an electrical cause is so strongly impressed by this description, that few persons retain any doubt of the origin of these appearances. The inhabitants on this occasion, say it is a troop of men furiously mad, which are passing by. Every animal is struck with terror. Even the dogs of the hunters are seized with such dread, that they will fall on the ground, and become immoveable, till the cause is over. — *Contemplative Philosopher.*

METEOR OF A FLAMING SWORD.

A STRANGE meteor was seen at Leeds, in Yorkshire, on Holy Thursday, 1710, which the common people called a flaming sword. It was seen in the neighbouring towns, but a great way to the north, as also above 50 miles south of Leeds. It appeared at a quarter past ten at night, and took its course from north to south. It was broad at one end, and small at the other; and was, by some, thought to resemble a trumpet, and moved with the broad end foremost. The light was so sudden and bright, that people were startled to see their own shadows, when neither sun nor moon shone upon them. It was remarkable, that all persons, though at many miles distance from each other, when they saw it, thought it fell within three or four furlongs of them, and that it went out with bright sparklings at the small end.—*Gallery of Nature and Art.*

THE SPECTRE OF THE BROKEN.

THE following observations on that singular phenomenon, called the Spectre of the Broken, in Germany, is related by Monsieur J. L. Jordan, in the following words:—

In the course of my repeated tours through the Hartz (mountains in Germany), I ascended the Broken twelve times; but I had the good fortune only twice (both times about Whitsuntide) to see that atmospheric phenomenon called the Spectre of the Broken, which appeared to me worthy of particular attention, as it must, no doubt, be observed on other high mountains, which have a situation favourable for producing it.

The first time I was deceived by this extraordinary phenomenon, I had clambered up to the summit of the Broken, very early in the morning, in order to wait there for the inexpressibly beautiful view of the sun rising in the east. The heavens were already streaked with red; the sun was just appearing above the horizon in full majesty, and the most perfect serenity prevailed throughout the surrounding country, when the other Hartz mountains in the south-west, towards the Worm-mountains, &c., lying under the Broken, began to be covered by thick clouds. Ascending at that moment the granite rocks, called the Teufelskanzel, there appeared before me, though at a great distance, towards the Worm-mountains, and the Achtermannshöhe, the gigantic figure of a man, as if standing on a large pedestal. But scarcely had I discovered it, when it began to disappear; the clouds sunk down speedily, and expanded, and I saw the phenomenon no more.

The second time, however, I saw this spectre somewhat more distinctly, a little below the summit of the Broken, and near the Heinrichshöhe, as I was looking at the sun rising, about four o'clock in the morning. The weather was rather tempestuous; the sky towards the level country was pretty clear, but the Harz mountains had attracted several thick clouds, which had been hovering around them, and which beginning to settle on the Broken, confined the prospect. In these clouds, soon after the rising of the sun, I saw my own shadow, of a monstrous size move itself for a couple of seconds, ex-

actly as I moved; but I was soon involved in clouds, and the phenomenon disappeared.

It is impossible to see this phenomenon, except when the sun is at such an altitude as to throw his rays upon the body in a horizontal direction; for, if he is higher, the shadow is thrown rather under the body than before it.

Lately, in the month of September, as I was making a tour through the Hartz with a very agreeable party, and ascended the Broken, I found an excellent account and explanation of this phenomenon, as seen by M. Hane, on the 23d of May, 1797, in his diary of an excursion to that mountain; I shall, therefore, take the liberty of transcribing it:

"After having been here for the thirtieth time," says M. Hane, "and, besides other objects of my attention, having procured information respecting the above-mentioned atmospheric phenomenon, I was at length so fortunate, as to have the pleasure of seeing it; and perhaps my description may afford satisfaction to others who visit the Broken through curiosity. The sun rose about four o'clock, and, the atmosphere being quite serene towards the east, his rays could pass without any obstruction, over the Heinrichshöhe. In the south-west, however, towards Achtermannshöhe, a brisk west wind carried before it their transparent vapours, which were not yet condensed into thick heavy clouds.

"About a quarter past four, I went towards the inn, and looked round to see whether the atmosphere would permit me to have a free prospect to the south-west; when I observed, at a very great distance, towards Achtermannshöhe, a human figure, of a monstrous size. A violent gust of wind having almost carried away my hat, I clapped my hand to it, by moving my arm towards my head, and the colossal figure did the same.

"The pleasure which I felt on this discovery can hardly be described; for I had already walked many a weary step, in the hopes of seeing this shadowy image, without being able to gratify my curiosity. I immediately made another movement, by bending my body, and the colossal figure before me repeated it. I was desirous of doing the same thing once more, but my colossus had vanished. I remained in the same position, waiting to see

whether it would return, and in a few minutes it again made its appearance on the Achtermannshöhe. I paid my respects to it a second time, and it did the same to me. I then called the landlord of the Broken, and having both taken the same position, which I had taken alone, we looked towards the Achtermannshöhe, but we saw nothing. We had not, however, stood long, when two such colossal figures were formed over the above eminence, which repeated our compliments by bending their bodies as we did; after which they vanished. We retained our position, kept our eyes fixed on the same spot, and in a little time the two figures again stood before us, and were joined by a third. Every movement that we made by bending our bodies, these figures imitated, but with this difference, that the phenomenon was sometimes weak and faint, sometimes strong and well defined. Having thus had an opportunity of discovering the whole secret of this phenomenon, I can give the following information to such of my readers as may be desirous of seeing it themselves. When the rising sun, and according to analogy, the case will be the same as the setting sun, throws his rays over the Broken upon the body of a man, standing opposite to fine light clouds floating around, or hovering past him, he needs only fix his eyes steadfastly upon them, and, in all probability, he will see the singular spectacle of his own shadow extending to the length of five or six hundred feet, at the distance of about two miles before him. This is one of the most agreeable phenomena I ever had an opportunity of remarking on the great observatory of Germany."—*Philosophical Magazine.*

SURPRISING EFFECT OF VISION.

The following account respecting the effects of mist, or vision, was related to a gentleman on the spot where it happened.

A shepherd upon one of the mountains in Cumberland was suddenly enveloped with a thick fog, or mist, through which every object appeared so greatly increased in magnitude, that he no longer knew where he was. In this state of confusion he wandered in search of some known

object, from which he might direct his future steps. Chance, at last, brought this lost shepherd within sight of what he supposed to be a very large mansion, which he did not remember ever to have seen before; but on his entering this visionary castle to inquire his way home, he found it inhabited by his own family. It was nothing more than his own cottage. But his organs of sight had so far misled his mental faculties, that some little time elapsed before he could be convinced that he saw real objects. Instances of the same kind of illusion, though not to the same degree, are not unfrequent in those mountainous regions.

From these effects of vision, it is evident, that the pupil, and the picture of an object within the eye, increase at the same time.—*Philosophical Magazine.*

The writer of this article was passing the frith of Forth, at Queensferry, near Edinburgh, one morning, which was extremely foggy. Though the water be only two miles broad, the boat did not get within sight of the southern shore till it approached very near it. He then saw, to his great surprise, a large perpendicular rock, where he knew the shore was low, and almost flat. As the boat advanced a little nearer, the rock seemed to split perpendicularly into portions, which separated at a little distance from one another. He next saw these perpendicular divisions move; and upon approaching a little nearer, found it was a number of people standing on the beach, waiting the arrival of the ferry-boat.—*Encyclopedia Britannica.*

The following extract of a letter which now lies before me (observes this gentleman) is given as another instance of this property of vision, from a gentleman on whose veracity I can place the greatest confidence.

"When I was a young man, I was like others, fond of sporting, and seldom liked to miss a day, if I could any way go out.

"From my own house I set out on foot, and pursued

my diversion on a foggy day, and after I had been out some time, the fog, or mist increased to so great a degree, that however familiar the hedges, trees, &c. were to me, I lost myself, insomuch, that I did not know whether I was going to or from home. In W——n field, where I then was, I suddenly discovered what I imagined was a well known hedge-row interspersed with pollard trees, &c. under which I purposed to proceed homeward; but to my great surprise, upon approaching this appearance, I discovered a row of the plants known by the name of *rag*, and by the vulgar *canker weed*, growing on a mere balk, dividing ploughed fields, the whole height of both could not exceed three feet, or three feet and a half. It struck me so forcibly, that I shall never forget it: this too, in a field which I knew as well any man could know a field."—*Philosophical Magazine.*

THE OCEAN.

There glorious mirror, where the Almighty's form
Glasses itself in tempests: in all time,
Calm or convulsed—in breeze, or gale, or storm,
Icing the pole, or in the torrid clime
Darts heaving;—boundless, endless, and sublime—
The image of Eternity—the throne
Of the Invisible; even from out thy slime
The monsters of the deep are made: each zone
Obeys thee: thou goest forth, dread, fathomless, alone.

LORD BYRON.

HAIL! thou inexhaustible source of wonder and contemplation!—Hail! thou multitudinous ocean! whose waves chase one another down like the generations of men, and after a momentary space are immerged for ever in oblivion! Thy fluctuating waters wash the varied

shores of the world, and while they disjoin nations, whom a nearer connection would involve in eternal war, they circulate their arts, and their labours, and give health and plenty to mankind. How glorious! how awful are the scenes thou displayest! Whether we view thee when every wind is hushed,—when the morning sun, as now, silvers the level line of the horizon, or when its evening tract is marked with flaming gold, thy unrippled bosom reflects the radiance of the over-arching heavens! or whether we behold thee in thy terrors, when the black tempest sweeps thy swelling billows, and the boiling surge mixes with the clouds,—when death rides the storm,—and humanity drops a fruitless tear for the toiling mariner, whose heart is sinking with dismay.—And yet, mighty deep, 'tis thy surface alone we view. Who can penetrate the secrets of thy wide domain? what eye can visit thy immense rocks and caverns, that teem with life and vegetation; or search out the myriads of objects, whose beauties lie scattered over thy dread abyss? The mind staggers with the immensity of its conceptions; and when she contemplates the flux and reflux of thy tides, which from the beginning of the world were never known to err, how does she shrink at the idea of that Divine Power, which originally laid thy foundations so sure, and whose omnipotent voice hath fixed the limits where thy proud waves shall be stayed."—KEATE's *Sketches from Nature.*

ALTHOUGH the ocean, properly speaking, is but one extensive sheet of water, continued over every part of the globe, without interruption; and although no part of it is divided from the rest, yet geographers have distinguished it by different names; as the Atlantic, or Western ocean, the Northern, Southern, Pacific, Indian, and German oceans.

In this vast receptacle, almost all the rivers of the earth ultimately terminate. And yet these vast and inexhaustible supplies do not seem to increase its stores; for it is neither apparently swelled by their tribute, nor diminished by their failure; it continues constantly the same. Indeed the quantity of water of all the rivers and lakes in

the world is nothing, compared to that contained in this prodigious reservoir. And some natural philosophers have carried their ideas on this subject so far, as to assert, in consequence of certain calculations, that if the bed of the sea were empty, all the rivers of the world flowing into it with a continuance of their present stores, would take up at least eight hundred years to fill it again to its present height.

Thus great is the assemblage of waters diffused round our habitable globe; and yet, immeasurable as it seems, it is rendered subservient principally to the necessities and conveniences of so little a being as man. Some have perceived so much analogy to man in the formation of the ocean, that they have not hesitated to assert it was made for him alone. This has been denied by others; and a variety of arguments have been adduced on both sides, into which I do not think it necessary to enter here; for, of this we are certain, that the great Creator has endowed us with abilities to turn this great extent of waters to our own advantage. He has made these things, perhaps, for other uses; but he has given us faculties to connect them to our own. This much-agitated question, therefore, seems to terminate here; we shall never know whether the things of this world were made for our use, but we very well know that we were made to enjoy them. Let us then boldly affirm, that the earth, and all its wonders are ours; since we are furnished with powers to force them into our service. Man is the lord of the whole sublunary creation; the howling savage, the winding serpent, with all the untameable and rebellious offspring of nature, are destroyed in the contest, or driven at a distance from his habitations. The extensive and tempestuous ocean, instead of dividing or limiting his power, only serves to assist his industry, and enlarge the sphere of his enjoyments. Its billows, and its monsters, instead of presenting a scene of terror, serve only to excite and invigorate the courage of this intrepid little being; and the greatest danger that man now fears from the deep, is from his fellow creatures. Indeed, if we consider the human race as nature has formed them, very little of the habitable globe seems to be made for them. But when they are considered as accumulating the wisdom of ages, in commanding the earth, there is

nothing so great, nor so terrible. What a poor contemptible being is the naked savage, standing on the beach of the ocean, and trembling at its tumults! How incapable is he of converting its terrors into benefits; or of saying, "behold an element made solely for my enjoyment!" He considers it as an angry deity, and pays it the homage of submission. But it is very different when he has exercised his mental powers, when he has learned to find his own superiority, and to make it subservient to his commands. It is then that his dignity begins to appear, and that the true Deity is adored, for having been mindful of man, for having given him the earth for his habitation, and the sea for his inheritance.—*Contemplative Philosopher.*

SALTNESS OF THE OCEAN.

The ocean is the great reservoir of water into which the lakes and rivers empty themselves, and from which is again drawn by evaporation that moisture which, falling in showers of rain, fertilizes the earth, and supplies the waste of the springs and waters. This constant circulation would naturally dispose one to believe, *à priori*, that the waters of the ocean do not differ much from the waters of rivers and lakes; but nothing would be more erroneous than such a conclusion, for the sea-water, as every one knows, differs materially from common water in its taste, specific gravity, and other properties. It contains a much greater proportion of saline matter, particularly of common salt, which is usually extracted from it. Indeed, if the sea were not impregnated with these saline bodies, the putrefaction of the immense mass of animal and vegetable matter which it contains, would in a short time prove fatal to the whole inhabitants of the earth.—*Gallery of Nature and Art.*

RIVERS IN ENGLAND.

THE THAMES.

WHAT a delightful ornament to a country is the winding course of a river! How much more exquisitely enchanting does it render the most beautiful landscape! and of what an unspeakable variety of benefits is it productive to the countries through which it flows! Hence rivers, in all their diversities of scenery, ever appear a favourite theme in poetical composition. Sir John Denham, in his poem of Cowper's Hill, gives the following fine description of the river Thames; the sweetness of the lines in which the simile is conveyed, have been objects of admiration, and perhaps of envy, by every succeeding poet.

THAMES the most lov'd of all the ocean's sons
By his old sire, to his embraces runs;
Hasting to pay his tribute to the sea,
Like mortal life to meet eternity.
Nor are his blessings to his banks confin'd,
But free and common as the sea or wind;
Where he, to boast or to disperse his stores,
Full of the tribute of his grateful shores,
Visits the world, and in his flying tow'rs
Brings home to us, and makes both Indies ours;
So that to us no thing, no place is strange,
While his fair bosom is the world's exchange.
O! could I flow like thee, and make thy stream
My great example, as it is my theme.
Though deep, yet clear; though gentle, yet not dull;
Strong without rage, without o'erflowing full.

The source of the Thames, this first of British rivers, is derived from a copious spring called Thames Head, near the village of Tarlton, about two miles west of Cirencester, and is contiguous to the fosseway leading to Somersetshire.

The name of this river has long been matter of controversy, even among the learned, on whom we ought to

rely. The vulgar appellation it bears above Oxford is Thame-Isis, evidently formed from a combination of the words Thame and Isis. How this river obtained the latter name, or at what period, we cannot learn.

Although it is the current opinion that the Thames had its name from the conjunction of the Thames and Isis, yet it is always called Thames before it comes near the Thame. This the annotator on Camden proves from ancient records, and adds, "it may be safely affirmed, that it does not occur under the name of Isis in any shorter or authentic history, and that the name is nowhere heard of, except among scholars; the common people all along, from the Spring-head to Oxford, calling it by no other name but that of the Thames."—IRELAND'S *Picturesque Views, and Gallery of Nature and Art.*

THE SEVERN.

THE Severn rises from a small lake on the red mountain of Plynlimmon, in Montgomeryshire, and is the principal beauty of the country, in which it receives so many small streams, that it becomes navigable near the town of Montgomery. It passes through the middle of Shropshire; on its banks are the towns of Shrewsbury and Bridgeworth; its course is through the centre of Worcestershire, from north to south, the city of Worcester and town of Tewkesbury being here seated on its margin. Entering Gloucestershire, it runs through the city of Gloucester, and discharges itself into a large bay, which, from the commercial city in its vicinity, is called the Bristol Channel. About 15 miles from its mouth a navigable canal has been constructed, which conveys the water of the Severn to within about two miles of Cirencester; they are then carried by a tunnel or archway, the height of which is 15 feet above the surface of the water, through Sapertoo hill, two miles and three furlongs in extent, for the purpose of communicating with the Thames at Lechlade. In November, 1789, this navigation was completed. The Severn is distinguished for the abundance of salmon which frequent it, and the lamprey which is almost peculiar to it; this last fish is in season

in the spring of the year, when it has a delicious taste, which abates as the season advances.—*Gallery of Nature and Art.*

THE TRENT.

The Trent rises among the moor-lands in the north-west part of Staffordshire, and has its waters increased by several rivulets, by the Sow, Charnet, Eccleshell-water, and other streams, and then runs to the eastward. It becomes navigable at Burton-upon-Trent, where it leaves this country, and flowing through those of Derby, Nottingham, and Lincoln, discharges itself into the Humber, that great receptacle of the northern rivers, running a course of near 200 miles. It enters Nottinghamshire at the south-west point, where it is joined by the Erwash, and passes to the eastward till it reaches Newark, where it forms an island; when turning to the north, after a track of about 14 miles, it forms the boundary of that county on the side of Lincolnshire. Poets have derived the name of this river from *thirty* kinds of fishes which are found in it, and from *thirty* streams which flow into it:

The bounteous Trent, that in himself inseams
Both thirty sorts of fishes, and thirty sundry streams.

But this ought only to be considered as a poetical fiction. Mr. Pennant determines the name to be Saxon, and says it is derived from its rising from three heads. The Dove which rises in the most northern point of Staffordshire, forms the boundary between it and Derbyshire, and joins the Trent a little below Burton. The Sow rises a few miles to the west of Newcastle-under-Lime, and falls into the Trent on the south-east. These are well stocked with fishes, especially the trout. A canal has been formed from Chesterfield, in Derbyshire, which passing through the northern part of Nottinghamshire, communicates with the Trent just below Gainsborough; it was begun in 1773, and completed in 1775. In its course a subterranean tunnel is cut through Norwood-hill, which extends 2,850 yards, or upwards of a mile and a half, so perfectly straight, that the termination at one end may be

seen at the other. The arch is twelve feet high, nine feet three inches wide, and in the deepest part 36 yards below the surface of the earth. By means of the numerous canals which are now formed in the north of England, a communication is opened between the Trent and the Mersey, or quite across the kingdom, from east to west.—*Gallery of Nature and Art.*

THE NEW RIVER.

This most noble undertaking, for the purpose of supplying the northern and western parts of the cities of London and Westminster, and nearly the whole of their environs, with that necessary of life, water, is by means of this river, which is conducted in an artificial canal, extending through a winding course of 38¾ miles, and sixteen poles, from the springs of Chadwell and Amwell, near Ware, in Hertfordshire. It was undertaken in the year 1606, by Mr. Hugh Middleton, citizen and goldsmith, of London, who was afterwards knighted, and at length created a baronet; but the title is now extinct. In about five years he had brought the water as far as Enfield, but having met with great difficulties, and strong opposition, he found himself extremely impoverished by the undertaking, and applied to the lord-mayor and corporation of London for assistance; but they refusing to be concerned, he made a more successful application to James I., who, in the year 1612, engaged to bear half the expense of the concern, on becoming a half partner in it; though the king was excluded from interfering at all in its management. The sums paid out of the exchequer at various times, from Easter, 1612, to September, 1614, in consequence of this covenant, were 6,347*l.* In the following year, water was brought into the basin, called "The New River Head," at Islington. It was then thought to be an object worthy of national attention, and Sir Hugh Middleton dividing his moiety into thirty-six shares, sold twenty-nine of them.

It was not, however, until the year 1633, that any dividend of profit was made, and Sir Hugh died in the year

1631; the portion of each twenty-ninth share was, at that time, 11*l.* 19*s.* 1*d.*; the second dividend was only 3*l.* 4*s.* 2*d.*; and instead of a third, a call upon the partners was expected to be made. Charles I., supposing little advantage would accrue from the undertaking, re-conveyed to Sir Hugh Middleton, in his life-time, the royal moiety, on condition of having secured to him and his successors a fee-farm rent of 500*l.* per annum. This moiety was likewise divided into thirty-six shares, which were called "the King's shares," as the other twenty-nine were "the Adventurers'," who were incorporated, by letters patent, in the year 1619, by the name of "The New River Company," and the government of the concern lodged in their hands.

In the year 1766, one of the king's shares was sold by public auction for 4,400*l.*; and in 1770, another king's share, or one seventy-second part of the whole, was purchased at a public auction for 6,700*l.* The corporation consists of a governor, deputy governor, treasurer, and twenty-six directors; a collector and his assistant, a surveyor and his deputy, collectors, and workmen. The canal, called "The New River," is carried over two vales, in wooden frames, or troughs, lined with lead; in its course are 43 sluices, and over it are 215 bridges. In some parts it is conveyed through subterranean passages

Sir Hugh Middleton left by his will some of his shares to the Goldsmiths' Company, to be divided among its poor members.

This adventurous baronet was possessed of mines in Cardiganshire, which he is said to have worked to so great advantage, as to have cleared 2,000*l.* a month for several years together, which enabled him to bring the New River water to London; but Mr. Pennant says, that he expended the whole on that great object, and was so reduced, as to support himself by becoming an hireling surveyor. One of his female descendants, being in very reduced circumstances, was, not many years ago, voted a small annuity by the corporation of London, in consequence of a petition which she presented.—*Gallery of Nature and Art.*

THE RIVER JORDAN.

In the middle of the night, of the 14th of April (says Abbé Maritis), we were desired to be ready to quit the plain of Jericho, that we might march forward to the river Jordan; and soon after we set out.

This march had something in it very grand, on account of the great number of lights carried by the horsemen which preceded and surrounded us. These lights are made by means of iron boxes, suspended from the points of lances, and in which is burnt the wood of the pine, or any other resinous tree. All persons of distinction travel in this manner during the night.

The plains here are intersected by ditches, rivulets, and torrents, which at this season of the year were dry. We found nothing worthy of observation in them but the ruins of an ancient church, dedicated to St. John the Baptist. Our pious orientals bowed themselves as they passed them; and out of respect for the memory of the saint, caused their horses to do the same.

An immense and beautiful meadow opened before us, in which we intended to erect our tents. It is washed by the waters of the river Jordan, which refresh it, and add greatly to its fertility. When we halted, two altars were erected in haste, upon which the fathers of the Holy Land celebrated mass. No time indeed could be more favourable for prayer. The first rays of the sun began to gild the summits of the neighbouring mountains: the clouds which obscured the heavens had retired, and displayed to view a most enchanting horizon: but in separating they shed upon the earth a gentle dew, which seemed to insinuate itself into my veins, to refresh my blood, and even my thoughts, if I may be allowed the expression, and to dispose my soul for joy and sensibility, and to inspire it with gratitude towards the Author of Nature.

But why should superstition, even in this rustic temple, be mixed with those prayers which were addressed to the Almighty? Here the pilgrim discharges his vow: his only intention, in undertaking this short journey, was to come and contemplate the sacred and miraculous waters, to drink of them, and to bathe in them; because it is

said, they purify both the soul and the body. The Greeks even imagine, that people are not properly baptized until they have plunged three times into the river Jordan. Men, women, and children, therefore, may be seen throwing themselves into the water together, with an eagerness almost bordering on madness, without thinking that they offend both against modesty and decency.

The custom of bathing in this river is as ancient as the age of Elisha. "Go," said that prophet, to Naaman, who was afflicted with the leprosy, "and wash in Jordan seven times, and thy flesh shall come again unto thee, and thou shalt be clean." Naaman obeyed; and as a reward for his faith, his blood was purified, and his flesh became as sound as that of an infant.

The Jordan, in the Arabic language, is called *Sceriah*. It has its source at the bottom of the Anti-Libanus, in the country called by the Syrians, Vadettin; and is formed from the waters of two fountains, which are a mile distant from each other. One of them lies to the east, and is called *Jor;* the other, which is exposed to the south, is named *Dan*. We see, therefore, that by uniting their waters, they have united their names also, to form that of the river to which they give birth.

The confluence of the two streams is found near the ancient city of Cæsarea Philippi, which is at present only a large village, inhabited by the Drusses, and called Behne.

The river begins its course between the east and the south; and, after running seven miles, falls into the lake Somochen, or Meron, at present called Hulet Panias.

This lake is six miles in length, from north to south; and may be about four in breadth, from east to west. Abundant in water during the winter, it is almost dry in summer, and leaves its muddy blackish bottom exposed to view. Its banks are covered with reeds and bulrushes; and in the neighbourhood arise a number of fruit-trees, forming a kind of forest, to which travellers would retire for the sake of its cool shade, had not ferocious animals, such as the tiger, made it their usual haunt. The Jordan issues from this lake, augmented by part of its waters; flows through the plain; and, two miles thence, passes under a stone bridge, called by the Arabs, *Gisrjaacub*, that

is to say, Jacob's bridge. This bridge is 60 cubits in length, and only ten in breadth. It consists of three arches, which appear to be exceedingly well constructed. The inhabitants have a great veneration for it, because they say, that the patriarch Jacob crossed it when he fled from the vengeance of his brother Esau.

We read, in William of Tyre, that this bridge served also as a bulwark to Baldwin IV., against the Saracen armies, and that this prince caused a citadel to be constructed upon a neighbouring hill.

The river follows the same direction between Tracontis and Galilee, as far as the lake of Tiberias, near the ancient Chorazin and Capernaum, with which it mixes its water.

When it issues from this lake, which it crosses for the space of 18 miles, it takes the name of Jordan Major. It advances 10 miles towards the south; divides Perea from Samaria, the plains of the Moabites from Judea; and receives in its passage several rivers, rivulets, and streams; such as the Jacob, which has its source in the mountains of Arabia; the Dibon, so called from a city of the Ammorites, near which it arises; the Jazer, that issues from a rock where there was a city of the same name, possessed by the tribe of Gad; and the Cherith, a considerable brook, celebrated, according to the Scriptures, for the retreat of the prophet Elijah, who was here fed by the ravens. After being augmented by all these streams, which water the beautiful plains of Aylona, in a course of 65 miles, from the lake of Tiberias, the Jordan throws itself into the Dead Sea.

This river may be, in general, about 35 cubits in breadth; but when the snow is thawed, or during the rainy season, its waters increase, overflow its banks, extend to the distance of more than four miles, and, on account of the inequality of the ground, are divided sometimes into two or three channels. It is about six cubits in depth.

It is so rapid, at all times, that the strongest swimmer cannot cross it, and I am of opinion (says the writer), that it would even be dangerous to cross it in a boat, unless one had the mantle of Elijah. Its waters are always muddy; but when taken from the river, and put into any kind of vessel, they immediately purify, leaving at the

bottom a black sediment, mixed with bituminous particles. These waters, however, are sweet, will not soon corrupt, and abound with fish.

Both sides of the Jordan are bordered by a forest of tufted trees which grow so closely in some parts, that they are impenetrable to the rays of the sun. This forest, like that in the neighbourhood of Lake Samochon, is the retreat of tigers, which sometimes carry desolation to the surrounding country.

These forests are peopled also with birds of every kind, and particularly with nightingales, whose melodious strains delight the ear, and make the traveller almost forget the danger of approaching the river.

The Jordan served, in some measure, to add to the triumph of Titus. A triumphal arch may still be seen at Rome, upon which this river is represented, under the figure of an old man leaning upon an urn, and submitting his head to the chains of the conqueror.

We find, in the annals of Florence, that Francis I., of Medicis, grand duke of Tuscany, was baptized with the water of the Jordan, which Albert Bolognetti, the nuncio, caused some merchants to bring on purpose, as if it had been endued with any superior virtue; but such was the superstition of the times, that people believed that the stains of original sin were better washed away by that water than by any other. It is astonishing, therefore, that the nobility, who at that period imagined they were much superior to the rest of mankind, did not think of causing themselves to be baptized with this privileged water, which would have imprinted on them at their birth so remarkable a distinction.

After the caravan had discharged their religious duties, we quitted the Jordan in order to return to Jericho.—ABBE' MARITI'S *Travels.*

THE RIVER NILE.

MR. BRUCE informs us, that the sources of the Nile are situated in the country of the Agows, in Abyssinia, and that the longitude of the principal fountain is thirty-six degrees fifty-five minutes thirty seconds east from

Greenwich. The place through which is the passage to the territory of the Agows, is called Abala; a valley, generally about half a mile, and never exceeding one mile, in breadth. The mountains which surround it are at first of an inconsiderable height, and covered to their very summits with trees and herbage, but as they proceed to the southward they become more rugged. Those to the west join a mountain called Asormaska, where they turn to the south, and enclose the territory of Sacala, which lies at the foot of them; and further to the westward is the small village of Geesh, where the fountains of the Nile are situated.

In order to know exactly the rise of the Nile, there is built, on a pleasant island opposite to Old Cairo, a place called the Makkias, in which is a famous pillar for measuring the Nile. It is fixed in a deep basin, the bottom of which is on a level with the bed of the river, the water passing through it. This pillar, which is placed under a dome, and crowned with a Corinthian capital, is divided into measures, for observing the rise of the waters; and from the court that leads to the house is a descent to the Nile, by steps, on which the common people believe that Moses was found after he had been exposed on the banks of the river.

As the river cannot of itself overflow the lands every where in the necessary proportion, the people have cut, with incredible labour, a vast number of canals and trenches from one end of Egypt to the other, so that almost every town and village has its canal, which is opened at the proper time, and conveys the water of the Nile to distant places. It is from these canals, where the banks of the Nile are high, that the lands are overflowed; but it is otherwise where they are low, particularly in the Delta, which is that part of Egypt that lies between the two mouths of the river*. Canals are carried along the higher

* A little below Cairo, the Nile divides itself into two large branches, which empty themselves into the Mediterranean at a great distance from each other, one near Rosetta, the other near Damiata: and thus the country between them is shaped something like the Greek letter Delta, from whence its name: But as to the seven mouths of the Nile, much spoken of by the ancients, they are not to be found at present, time having made a great alteration in the face of the country.

grounds, that the water may have a fall from them to the lower parts; and from the great canals it is drawn out into small channels, and conveyed all over the country It is likewise observable, that, as they have dikes or banks to keep the water out of the canals till the river be risen to a proper height to let it in, so in some of them they have contrivances to keep it in after the Nile is fallen, and also preserve it in certain lakes or ponds, from whence they can let it out upon their lands at pleasure.

The reader, however, is to understand, that some parts of the country lie too high to be watered by means of the canals, and several gardens and plantations require more refreshment than what they receive from the annual inundation; and on this account they are obliged to raise water from the river, which is lodged in cisterns or reservoirs contrived for that purpose. This is generally done by the Persian wheel, a machine turned by oxen, which carries a rope hung with several vessels, that fill as it goes round, and empty themselves at top into the reservoir. They have another contrivance where the bank of the river is high; in which case they make a basin on the side of it, fixing near it an upright pole, and across the top of that another with an axle, at one end whereof hangs a great stone, and at the other a leathern bucket, which, being drawn down into the water by two men, is raised up again by the weight of the stone, the men directing it, and emptying it into the basin. The former of these machines is chiefly used in the lower parts of Egypt, the latter in the higher; for, as we advance up the river, the difficulty of raising the water increases.

We may judge how much the fertility of Egypt is owing to the inundation of the Nile, when we consider that it leaves behind it a stratum of mud or slime, which, without any other manure, renews all the strength of the soil that the preceding harvest had impaired; nay, it is frequently found necessary to temper it with a little sand, to abate its excessive richness. And here it is worth observing, that the surface of the ground must have been considerably raised, in a long course of years, by these repeated accessions of mud and slime, so that formerly a less rising of the Nile was sufficient to overflow the country than at present. As to the quantity of mud thus

annually left by the river, it is a point not easy to determine; but Dr. Shaw supposes that the surface of the land of Egypt is thereby raised somewhat more than a foot in a hundred years; according to which computation, the perpendicular accession of soil from the deluge to the present time, must have been about forty-two feet. And hence the Doctor imagines, that in process of time the whole country may be reduced to the greatest barrenness, by being raised so high that the river will not be able to overflow its banks. But Dr. Pococke is of another opinion, as supposing that a great quantity of soil is annually carried off in the productions of the earth, (which in Egypt is not supplied by manuring) and that the bed of the Nile may be raised by the subduing of the heavier sandy particles; for which reason he thinks it impossible that the land will ever rise to such a height, as to be deprived of the usual inundations. He observes, however, if that should ever be the case in Lower Egypt, the inhabitants would only be in the condition of those of Upper Egypt, who are obliged to raise the water by art and labour.

With respect to the distribution of the waters of the Nile by means of canals, *&c.*, we shall only add, that there is a great canal called Khalis, which runs from the river quite through the city of Cairo, and several miles beyond it. Near the mouth of this canal there is a mound or mole, which is every year broken down with great solemnity and rejoicing, when the Nile rises to the height of sixteen peeks; and thereby the water is conveyed into the city, and from thence into the gardens, and the adjacent country. The bashaw himself, accompanied by all his great officers, and attended by a vast multitude of people, assists at the ceremony of cutting this bank; and on this occasion the trumpets and other music, the repeated shouts of the people, the firing of guns, *&c.*, make an agreeable confusion. In short, bonfires, illuminations, fireworks, several sorts of games and exercises, and whatever can express an universal joy, are continued for three days and nights successively. M. Thevenot, who was twice present at this ceremony, tells us, that among other diverting sights exhibited on that occasion, he saw two swimmers, whose performances were very surprising. One of these, with his hands tied behind him, and his feet bound with a

chain weighing ten pounds, stood upright in the water and in that manner went from the opening of the canal quite through Cairo, which is three miles and upwards. The other fellow swam in chains from one end of the canal to the other, with a pipe in his mouth, and a dish of coffee in his hand, without spilling it; and both these swimmers were handsomely rewarded.—SMITH'S *Wonders.*

THE DANUBE.

THE Danube, the most considerable river in Europe, takes its rise in the Black Forest in Germany, from whence to its fall into the Black Sea, it performs a course of above 1,500 miles, at a moderate computation, without including its windings and turnings. It has also several remarkable cataracts, the most remarkable of which are the Saw Russel, or Swine's Snout, near Lintz, so called from a prominent rock which overhangs a dangerous whirlpool; and another called Der Strudel, where the falling of the water makes a dreadful noise.

THE TIBER, CASTLE OF ST. ANGELO, AND VATICAN, AT ROME.

THIS stream, immortalized both in prose and verse, and by far the most considerable, in the middle or mouth, of Italy, is said to derive its name from Tiberinus, an early Latin king, and direct descendant of Oneus, by Lairina, who was drowned in its waters in the course of a battle which was fought on its banks.

At the bridge of St. Angelo the river is about 315 feet wide, and is navigable for large vessels. The Cathedral, Vatican, and Castle of St. Angelo, which are seen to very great advantage from the bridge, form a scene so highly picturesque and beautiful, that artists of the greatest celebrity have always selected it as a desirable subject for their pencil.

LAKES.

LAKE SUPERIOR.

Lake Superior, in North America, is so called from its magnitude, as being the largest on the continent. It may properly be termed the *Caspian* of America, and is supposed to be the largest body of fresh water on the globe. According to the French charts, it is 1,500 miles in circumference; but Mr. Carver supposes that if the utmost extent of every bay were taken, it would exceed 1,600. The water is pure and transparent, and appears throughout the lake to lie upon a bed of huge rocks. It is worthy of remark with respect to the waters of this lake, that although their surface, during summer, is very warm, yet on letting down a cup to the depth of about six feet, the water drawn from thence is excessively cold.

Though this lake is supplied by near forty large rivers, yet it does not appear that one-tenth of the waters conveyed into it is discharged through the only visible outlet. How such a superabundance of water can be disposed of remains a secret; but it certainly has a passage through some unfathomable subterraneous cavities. The entrance into the lake from the straits of St. Marie, affords one of the most beautiful prospects in the world. On the left appear many pleasant little islands; and on the right is an agreeable succession of small points of land, that project a little way into the water, and contribute, with the islands, to render this delightful basin calm and secure from tempestuous winds.—Smith's *Wonders.*

LAKE OF THE DISMAL SWAMP.

The lake of the Dismal Swamp, between Alexandri and Virginia, which contains about 250 square miles gave rise to the following beautiful little ballad, written by Mr. Moore, the elegant translator of Anacreon, *&c.* The story is supposed to be the exclamation of a

maniac, upon the death of a lady to whom he paid his addresses, and whose loss deprived him of his senses. The scene is the lake of the Dismal Swamp.

THEY made her a grave too cold and damp
For a soul so warm and true,
And she's gone to the lake of the *Dismal Swamp*,
Where all night long, by a fire-fly lamp*,
She paddles her white canoe

And her fire-fly-lamp I soon shall see
And her paddle I soon shall hear:
Long and loving our life shall be,
And I'll hide the maid in a cypress-tree,
When the footstep of death is near.

Away to the Dismal Swamp he speeds,
His path was rugged and sore,
Thro' tangled juniper beds of reeds,
Thro' many a fen where the serpent feeds,
And man ne'er trod before.

And when on the earth he sank to sleep,
If sleep his eye-lids knew,
He lay where the deadly vines do weep
Their venomous tears, and nightly steep
The flesh with blistering dew.

And near him the sea-wolf stirr'd the brake,
And the rattle-snake breath'd in his ear,
Till he starting cried, from his dream awake,
Oh when shall I see the dusky lake,
And the white canoe of my dear?

He saw the lake; and a meteor bright
Quick o'er the surface play'd.
"Welcome," he said, "my dear one's light!
And the dim shore echoed for many a night
The name of the death-cold maid!

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* The Fire-fly is an insect common in this part of the country. In its flight, at short intervals, it sheds a beam of apparent fire, or lightning, brighter than the glow-worm. It is so perfectly harmless that the children amuse themselves in following and catching it. It is said that three or four of these insects tied to the top of a stick, are used by travellers as a torch.

Till he formed a boat of the birchen bark,
Which carried him off from the shore;
Far he followed the meteor-spark;
The winds were high, and the clouds were dark,
And the boat return'd no more;

But oft from the Indian hunter's camp
This lover and maid so true,
Are seen by the hour of midnight damp,
To cross the lake by a fire-fly lamp,
And paddle their white canoe.—*Stranger in America*.

LAKE YANG-TSE, OR SON OF THE SEA.

Among a number of lakes and rivers of very extraordinary dimensions, that are found in the vast empire of China, there are two particularly celebrated. The first, called Yang-tse, or Son of the Sea, rises in Yun-nen, and after flowing through an extent of 400 leagues, and watering four provinces, empties itself into the eastern sea, forming an island at its mouth, from the sand it throws up. Before Nankin, and at the distance of thirty leagues from its mouth, it is half a league wide; and its depth is so great that the Chinese have the following proverb concerning it. "The sea hath no bounds and Kiang no bottom." It flows with great rapidity, forms several islands in its course, and produces a multitude of reeds, from ten to twelve feet nigh, that serve the provinces through which it passes, with fuel; but when swelled with torrents, it carries away the greater part of these islands, and forms others from their respective wrecks. Its navigation is extremely dangerous; and a number of vessels are lost in it almost every day.

The other great river is the Hoang-ho, or yellow river; which seems to have derived its name from the yellowness of its water, occasioned, in wet seasons, by the yellow clay and sands that are washed into it. This river rises in the mountains which bound the province of Tetchuen on the west; and, after a course of 600 leagues across China and Tartary, it discharges itself into the eastern sea, at a small distance from the Kiang. It is very broad and

rapid, but so shallow as scarcely to be navigable; yet it frequently overflows its banks, and inundates whole villages. In order to avert this evil, several dikes have been constructed in its immediate vicinity, and the inhabitants of the province of Honan have surrounded most of their cities, at the distance of three furlongs, with strong ramparts of earth, faced with turf.—SMITH'S *Wonders.*

LAGO MAGGIORE.

THE Lago Maggiore, in the Duchy of Milan, which is 65 Italian miles in length, and in most places 6 broad, is every where environed with hills, covered with vineyards, and plantations of chestnut-trees; and along the banks are fine rows of trees and walks, arched with vine-branches. This beautiful prospect is heightened by large natural cascades falling from the mountains. In this lake are the two celebrated islands, Isola Madre, and Isola Bella, which have been compared to two pyramids of sweetmeats, adorned with green festoons and flowers. at one end of the garden of the Isola Bella, are ten terraces, the perpendicular height of which, taken together, is 60 German ells above the height of the water. These terraces decrease proportionably in their circuit, as they rise towards the top of the hill, where an oblong area, paved with fine stone, and surrounded with a balustrade, affords a most delightful prospect. It is in length from 45 to 50 common paces; and on every side stands a range of marble statues of a gigantic size. Round every terrace is a pleasant walk, and at the four angles are large statues and pyramids placed alternately, The garden of Isola Bella has on the south two round towers, in which are very lofty apartments adorned with red and black marble, with a covered gallery, supported by stone columns, and shaded by lemon trees. Towards the east is a delightful walk of large orange-trees, disposed in four or five rows, with a grove of olives, and a cascade that falls down about twenty steps. In the palace is a multitude of fine paintings, vases, busts, and other curiosities; and on going from the house towards the garden, the smell is

refreshed with mingled odours of fruits and flowers. The first contre-espalier consists of bergamot, lemon, and citron-trees; next appears a high range of orange-trees, beyond which is a lofty grotto, adorned with statues, and water-works. Over its centre is an unicorn of an enormous size, in a springing attitude, with a Cupid on its back.

The other island, named Isola Madre, has seven high but sloping terraces, is formed into a beautiful garden, and contains a palace, adorned with paintings. The garden abounds with espaliers of citron and orange-trees, groves of cedar, laurels, statues, and other decorations; and recals to mind the fabulous descriptions that have been given of enchanted groves and islands.—SMITH'S *Wonders.*

LAKE VETTER.

AMONGST the lakes of Sweden, that called Vetter, is so remarkable in many respects, that it deserves particular attention. It divides East and West Gothland, being in length, from north to south, above 80 miles, and about 18 broad in the middle, growing narrower towards each extremity. The water of this lake is very clear, and in some places so deep, that it has been sounded with 300 fathoms of line without finding the bottom. For the most part it is free from rocks, and has but few islands, the principal of which is Visingsoe, lying in the middle of the lake. It is often disturbed by storms, and sometimes so suddenly, that the surface begins to be ruffled before the least breath of wind is perceived, so that the cause seems to proceed from the bottom of the waters; and it is no uncommon thing for boats to be tossed by a storm in one part of the lake, whilst others at a small distance enjoy a perfect calm.

That such eruptions and agitations of the water are promoted by subterraneous winds, seems to be confirmed by various phenomena; for immediately before a storm, and whilst the sky is yet clear, there is perceived a noise like thunder in the lake, which is always followed by a tempest. Of this the inhabitants of Visingsoe are more

sensible than any others; for from that part of the island whence the wind will blow the next day, they hear a confused noise like the firing of cannon; and when this rumbling is heard in the east, it is generally followed by rain and hail. Some people have likewise observed, while the water has been very calm, a great number of little clouds, like so many darts, rising up from the bottom of the lake, which, uniting in the air, form a kind of mizzling rain; whence it plainly appears, that this is, in a great measure, owing to subterraneous winds. To such winds also, together with those from above, we may attribute the sudden thawing of the ice in the spring, which one minute is strong enough to bear horses and sledges, and the next is broken to pieces. The strange noise of the waters, which precedes this terrible eruption, warns travellers to make the best of their way; but those who happen to be at a great distance from land are immediately drowned, or float upon shoals of ice till they meet with relief; and what is still more dangerous, the least blast of wind will sometimes sink the ice suddenly to the bottom.

The violent under-currents of water, observed in this lake are also very surprising, which directly opposing the winds and waves, give the fishermen a great deal of trouble. From these, as well as from its unfathomable depth, and subterraneous winds, it is supposed to have a communication under ground with another large lake, called Venner, about 40 miles to the westward; and this seems to be confirmed by several whirlpools that lie between these lakes, two of which have been sounded, and found of a vast depth. What farther countenances this opinion is, that some years, without any visible cause, the waters increase, and decrease again the following year, as several persons have observed.

In the vicinity of this lake is a spring called the Hungry or Prophetic Fountain, because the peasants assert, that it never has plenty of water but when there is a scarcity of corn the following year. It lies in a valley encompassed with sandy hills, and has this peculiarity, that in a rainy season it is commonly dry, whereas in the dryest summers it sometimes overflows the highway near Vadstein. In 1685, which was a very wet year, this spring was quite

dried up; but the next summer, which was not so rainy, it was observed to increase: and in the remarkably dry summer of 1705, when all the neighbouring springs entirely failed, this had a plentiful stream of water.

Cataracts, as we have already observed, are frequent in the rivers of Sweden; but the most noted of all, and the only one worth giving an account of, is that within a few leagues of Gottenburg; where a river, which issues from the lake Venner, falls down a prodigious high precipice into a deep pit, with a terrible noise, and with such violence, that large masts, which are floated down the river to Gottenburg, frequently dive so far under water by the fall, if they happen to pitch endways, that some are half an hour, others three quarters, and some a whole hour before they rise up again to the surface. Many attempts have been made to find the depth of this hole, with lines of several hundred fathoms, but no bottom could ever be discovered.—SMITH'S *Wonders.*

CIRENITZ LAKE.

NONE of the curiosities in Germany are more surprising than the Cirenitzer sea, or lake, in Carniola, so called from the neighbouring town of Cirenitz. This lake is four or five miles in length, and about two in breadth, surrounded, at some distance, with mountains, which are richly clothed with wood, and abound with deer, wild boars, hares, and other game. It is said, that in this lake a person may sow and reap, hunt and fish, within the space of a year; but this is the least remarkable circumstance belonging to it, and is no more than may be said of almost any other spot that is overflowed at certain seasons. The most wonderful circumstance is, its ebbing and flowing. The former always happens in a long drought, when it runs off through eighteen holes at the bottom, which form so many eddies or whirlpools. Valvasor mentions a singular mode of fishing in one of these holes, and says, that when the water is entirely run off into its subterraneous reservoirs, the peasants venture with lights into that cavity, which runs in a hard rock,

three or four fathoms under ground, to a solid bottom; whence the water running through small holes, as through a sieve, the fishes are left behind, caught, as it were, in a net provided by nature.

On the first appearance of its ebbing, a bell is rung at Cirenitz, upon which all the peasants in the neighbouring villages, with the utmost diligence, prepare for fishing; for the fish seldom stay till the water is considerably decreased. Above a hundred peasants exert themselves on this occasion, and both men and women promiscuously run into the lake without any covering, though both the magistrates and clergy have used their endeavours to suppress this indecent custom, particularly on account of the young lay-brothers of a neighbouring convent who have the privilege of fishing there; and notwithstanding the prohibitions of the fathers, leave the convent to see this uncommon spectacle. At these ebbings, an incredible number of pikes, trout, tench, eels, carp, perch, *&c.*, are caught in the lake; and what are not consumed, or disposed of while fresh, are dried by the fire.

Though the whole lake is left dry, except two or three pools, yet, upon the return of the water, it abounds in fish as much as it did before; and the fishes that return with the water are of a very large size. It is also remarkable that when it begins to rain hard, three of the cavities spout up water to the height of twelve or eighteen feet, and if the rain continue, and be accompanied with violent thunder, the water bubbles out of the holes through which it had been absorbed, and the whole lake is again filled in 24, and often in 18 hours. Sometimes not only fish, but live ducks, with grass and fish in their stomachs, have emerged from these cavities.—Smith's *Wonders.*

INFLAMMABLE LAKE.

The Baikal in Siberia is a large lake, lying between 52 and 55 degrees of north latitude, and computed to be 500 wersts in length, but only 20 broad, and in some places not above 15. It is environed on all sides by high mountains; and in one part of it, which lies near the river

Bargufin, it throws up an inflammable sulphurous liquid called *maltha*, which the neighbouring peasants burn in their lamps. Its water at a distance appears of a sea-green colour, but is perfectly fresh, and so clear that objects may be plainly seen at the depth of several fathoms, This lake is called by the neighbouring rustics *Swiatoie more*, or the *Holy Lake*, and they imagine, that when storms happen on it, they will be preserved from all danger by complimenting it with the title of *Sea*. When it is frozen over, people travel upon it in the road to China, but they must be very sharp shod, in order to tread safely on the ice, which is exceedingly smooth. Notwithstanding the ice is sometimes two ells thick, there are some open places in it, to which tempestuous winds will often drive the unfortunate passengers, who in that case must inevitably perish. This lake contains several small islands, and the borders are frequented by sables and civet-cats.

SULPHUR LAKE.

About ten miles from Nikuschkina, in Siberia, is a remarkable sulphur lake, situated between two high mountains. It is an oblong basin, overgrown with birches, about 420 feet long, and 340 broad. Its aspect is frightful, and its abominable stench may be smelt at the distance of three miles. It has no perceptible motion, and never freezes. A visible thick vapour rises from its surface; yet the water is so clear that one might discern its depth, if it were not for the black and greasy soil which forms its border. Some attempts have been made to discover the origin of the sulphur; but these have all proved fruitless.

WHIRLPOOLS.

NEAR the coast of Norway, in about latitude 68, is a vast whirlpool, commonly called Maelstrom, or Moskoestrom, from the island of Moskoe, and by mariners the Navel of the sea. Its violence exceeds that of a cataract, being heard at a great distance, without any intermission, except for a quarter of an hour, at the turn of high and low water, when its impetuosity seems at a stand; but this motion soon returns, and gradually increases with such a draught and vortex, as absorbs whatever comes within their sphere of action, keeping it for some hours under water, when the fragments shivered by the rocks appear again. From this circumstance several authors imagine, that here is an abyss, which penetrates the globe, issuing in some very remote parts. But the learned Bishop Pontoppidan observes, that there is no foundation for this conjecture; it having no other cause than the collision of the waves, rising and falling at the flux and reflux, against a ridge of rocks and shelves, which confine the water, so that it precipitates like a cataract, and thus the higher the flood rises, the deeper must be the fall, the natural result of which is a whirlpool. Mr. Ramus is of the same opinion, and observes, that at the the time of flood, the streams run up the country, between the islands of Lofoden and Moscoe, with a boisterous rapidity; but the roar of its impetuous ebb to the sea, is scarcely equalled by the loudest cataracts, the noise being heard at the distance of several leagues. The whirlpool is then of such extent and depth, that if a ship comes within its attraction, it is inevitably absorbed, and dashed to pieces against the rocks at the bottom. But when the stream is most boisterous, and its fury heightened by a storm, it is dangerous to come within six English miles of it; ships, boats, and yachts, having been carried away by not guarding against it, before it was too late. It frequently happens that even whales, coming too near the stream, are overpowered by its violence; and then it is

impossible to describe their bellowings in their fruitless struggles to disengage themselves. A bear once attempting to swim to the island Moscoe, in order to prey on the sheep feeding on the island, afforded a similar spectacle: for the stream caught him, and bore him down, while he roared so terribly as to be heard on shore. It is remarkable that large firs and pine-trees, after being absorbed by the current, rise again with their trunks so broken and lacerated, that they seem as if covered with bristles.

The account we have of the whirlpools about the islands of Ferro, which belong to the crown of Denmark, given us by Mr. Jacobson Debes, provost of the churches in those islands, is also very extraordinary. The most dangerous is that which lies south of Suderoe, near a rock called the Monk, where several vessels have been swallowed up. The sea round this whirlpool is eighty or ninety fathoms deep, and the surface of the water is smooth and serene; but a little farther in, the ground lies at the depth of 25 or 30 fathoms, where the sea begins to rise and turn round. Within this the ground lies from eight to ten or twelve fathoms deep, in four circles; and rises up in points or clifts; which are about eight fathoms under water, and about twelve distant from each other. Between these circles are three channels from 25 to 30 fathoms deep, wherein the sea runs round; and within every circle is a hole, the depth of which, in the middle, is above 60 fathoms. The innermost current turns round but slowly, but the others with great swiftness. On the south side of this hole the rock called the Monk rises ten fathoms above the water, and north of this are six lesser rocks, on the top of which, our author observes, the compass runs round like the whirlpool. Considering the danger that vessels run by approaching this vortex, the reader may probably wonder how so particular a description of it could be taken; but our author informs us, that in very calm weather, during the reflux of the sea, the inhabitants venture to fish there, and to climb the rocks.—SMITH'S *Wonders.*

THE GEYSER, OR HOT SPRINGS OF ICELAND.

SPRINGS AND WELLS.

SPRING WITH THREE STREAMS.

Near Paderborn, in Westphalia, is a curious spring which loses itself twice in 24 hours, but returns again with a great noise, and with such force, that its stream turns three miles a little below; for which reason it is called the Bolder Born, or Boisterous Spring. Another remarkable spring near the same city, sends forth three streams at a little distance from each other; one of which is bluish, luke-warm, and impregnated with vitriol, alum, sulphur, and other minerals; the second with much the same taste, but turbid, whitish, and as cold as ice; and the third tasting both sour and sweet, but very clear, and of a greenish colour.—Smith's *Wonders.*

ASPHALTIC SPRING.

On the borders of the river Sok, and in the vicinity of Semenowe, in Muscovy, is an asphaltic spring, on the steep declivity of a mountain, overrun with birch trees, whose soil is a fat and black earth. This spring forms a reservoir about three feet wide, which is not only constantly full without any agitation, but also flows over, and forms a little brook. The water never freezes, even in the most rigorous season; and when it is covered with snow, the bituminous vapours soon make an opening, though the water possesses no extraordinary degree of warmth. The surface of this well is covered with a black and tough asphaltos, which has the appearance and consistency of thick tar, and as often as it is taken off, will gather again in a few days. The neighbouring peasants use this bituminous water as a remedy for all infections and ulcerous complaints of the mouth and throat: they also gather the asphaltos, and use it both externally and internally with good success.—Smith's *Wonders.*

OILY SPRINGS.

In the duchy of Modena, in Italy, are several springs or wells, from the surface of which is gathered a subtile, inflammable, mineral oil, of a fragrant bituminous smell, and of different colours. This is called petroleum, oil of petre, or rock-oil, because it frequently issues from the clefts of rocks, and the springs on which it floats are generally found on craggy mountains. Near a place called Frumetto, the inhabitants dig wells to come at these oily springs, and find in those at the bottom of the hill a large quantity of red oil, but those near the top yield a white oil, as clear as water. There is another rock near the Apennines, in the same country, whence rises a perpetual spring of water, on which this oil swims in such quantities, that twelve pounds of it are gathered every week.

In the sea near the foot of mount Vesuvius is also found petroleum. During the time that it rises, the surface of the sea is, for a little space, covered with bubbles, which they skim off into their boats, and afterwards set to separate in pots and jars: but its sources are said never to run but when the weather is warm and serene.

The white transparent petroleum is reckoned the best, next to that the yellow and the red, but the black is accounted the most impure of all.—This oil is very warm and penetrating, and has been recommended in rheumatic and paralytic disorders.—Smith's *Wonders*.

THE GEYSER, OR BOILING SPRING.

Among the boiling springs in the neighbourhood of mount Hecla in Iceland, none is more wonderful than the Geyzer, or Geyser, which rises in the midst of other springs near to the hills. The water boils with a loud rumbling noise in a well of an irregular form, about six feet in its greatest diameter; from thence it bursts forth into the air, and subsides again nearly every minute. The jets are dashed into spray as they rise, and are from 20 to 30 feet high. Volumes of steam or vapour ascend

with them, and produce a most magnificent effect, particularly if the dark hills, which almost hang over the fountain, form a back ground to the picture. The jets or forced in rising to take an oblique direction, by two rre three stones which lie on the edge of the basin. Between these and the hill, the ground (the distance of eight or nine feet) is remarkably hot, and entirely bare of vegetation. If the earth is stirred, a stream instantly rises, and in some places it is covered with a thin coat of sulphur, or rather we should say some loose stones only are covered with flakes of it. In one place near it, there is a slight effloresence on the surface of the soil, which by the taste appears to be alum. On the whole this beautiful boiling cauldron, is a most truly interesting object for all curious travellers.

MEDICINAL SPRING.

In the county of Wilkes, in Georgia, is a medicinal spring, which rises from a hollow tree, about five feet in length. The inside of the tree is covered with a coat of nitre, an inch thick, and the leaves around the spring are incrusted with a substance as white as snow. The water is said to be a sovereign remedy for the scurvy, gout, consumption, and every other disease arising from humours in the blood. A person who had a severe rheumatism in his arm, having, in the space of ten minutes, drank two quarts of the water, experienced a momentary chill, and was then thrown into a perspiration, which in a few hours left him entirely free from pain and in perfect health.

BOILING SPRING.

In the county of Cape May, in North America, is a spring of fresh water, which boils up from the bottom of a salt water creek, which runs nearly dry at low tide; but at flood tide is covered with water directly from the ocean to the depth of three or four feet; yet in this situation by

letting down a bottle well corked, through the salt-water into the spring, and immediately drawing the cork with a string prepared for that purpose, it may be drawn up full of fresh water.

BITUMINOUS SPRING.

In the low grounds of the great Kanhaway, seven miles above the efflux of Elk river, in North America, is a large hole in the earth, from which incessantly issues a bituminous vapour, in so strong a current, as to give to the sand about its orifice the motion which it has in a boiling spring. On presenting a lighted torch or candle within eighteen inches of the aperture, the vapour flames up in a column of 18 inches diameter and four feet in height, which sometimes burns out within 20 minutes, and at other times has been known to continue for upwards of three days. The flame is unsteady, and of the same density with that of burning spirits, and smells like burning pit-coal. Water sometimes collects in the basin, which is remarkably cold, and is kept in ebullition by the vapour issuing through it; and it is a singular fact, that if the vapour be fired in this state, the water becomes hot, and evaporates in a very short time.—Smith's *Wonders.*

HOT AND COLD SPRINGS.

Near the city of Constantia, in the kingdom of Algiers, there is a very hot spring, and at a little distance another that is extremely cold, with a stone structure embellished with statues and other ornaments. The neighbouring people who are very ignorant, have a notion that this place was a college, the masters and scholars of which being very wicked were transformed into these statues. Nor is this the only superstitious opinion that prevails among them, especially the women; for there are great numbers of snails bred among these springs, which their marabbuts, a sort of conjuring priests, have persuaded

them are malicious spirits that do them all the hurt they can, giving them violent fevers and other diseases; and the credulity of those poor people the marabbuts fail not to turn to their own advantage.

In the vicinity of Amboule, a large town of Madagascar, there is a fountain of hot water, within 20 feet of a small river, whose sand is almost burning. The water of the fountain is said to boil an egg hard in two hours; and the inhabitants affirm it to be a sovereign remedy against the gout.

At the foot of the declivity adjoining to the south side of Charles-town, there is a little hot river called "the bath," supposed to flow from sulphurous ground. This rivulet runs at least half-a-mile before it loses itself in the sands of the sea; and towards the sea-side there is a particular part of it where a man may set one foot upon a spring that is excessively cold, and the other upon another spring that is surprisingly hot. All distempered people, both whites and blacks, find great benefit from this hot river.

ST. WINIFRED'S WELL.

Holy-Well, or St. Winifred's Well, in Flintshire, is famous for the wonderful cures it has effected, particularly upon cripples, who have frequently left their crutches there as monuments of their recovery. This fountain issues from a rock into a cavity formed like a basin or cistern, in which the patients bathe. The water is remarkably cold, and the stream so large and rapid, that it turns several mills below its source. It is well known what extraordinary effects are produced by cold bathing; but many of the country people believe that the cures wrought by this well are miracles.

The story of its origin is related in the *Golden Legend*,

printed by Wynkin de Worde, in the year 1512, and is in substance as follows:

St. Winifred, a beautiful and devout virgin, having fled from a young man called Cradock, the son of a king named Alane, who would have dishonoured her; he pursued and overtook her near the church, where, on her refusal to yield to his desires, he with his sword cut off her head.

On the spot where it fell, there suddenly sprang up a fair well, yielding a vast quantity of exceeding clear water, yet famous for its wondrous virtues in healing divers diseases; at the bottom of the well are to be seen stones spotted with blood, which stains cannot by any means be effaced; and round its sides grows moss of a marvellous sweet odour.

St. Bueno, a holy man, coming from the church to the spot where the body lay, and finding the murderer, who had not power to move from thence, he first replaced the head, and then by his prayers raised Winifred to life, and struck Cradock suddenly dead; whose body turning black, was instantly conveyed away by fiends. Soon after St. Bueno going to Ireland, ordered St. Winifred to send him an annual token, which was to be put on the stream of the well, from whence it would be carried to his place of residence, 50 miles beyond the sea.

Against the time appointed, she prepared him a chasuble of silk, and wrapping it up in a white mantle, laid it as directed, from whence it was miraculously conveyed to this holy man, through the waves of the sea.

This St. Bueno, who founded many churches in North Wales, according to Wilson's Martyrology, died in the year 660.

On the decease of St. Bueno, this holy virgin was warned by a voice to call on St. Deifer, at Badvari; by St. Deifer she was directed to go to St. Saturnus, at Henllan; and by St. Saturnus, to seek a final retreat with St. Elerius, at Gwytherin. Hither she repaired, found a convent of nuns, received the veil from the Saint, and on the death of the Abbess Theonia, succeeded to that high charge. She died on the 3d of November, fifteen years after her resuscitation; but had always a red circle round her neck, where her head had been severed from her body. Here

her body rested in quiet, near that of her predecessor, for five hundred years; but a miracle having been wrought, as was supposed by her intercession on a monk of Shrewsbury, the abbot determined on the translation of her remains to their monastery. Seven holy men were deputed to solicit it, but the inhabitants of Gwytherin refused to part with such a treasure. Visions determined the former to persist in their request; but at length, on the declaration of the will of heaven, by another vision to the parson of Gwytherin, who declared to his flock the impiety of farther resistance, the reliques were delivered up, and carried with triumph to the place of destination.

Giraldus Cambrensis (a man very ready to relate any wonderful story) not having mentioned this miracle, gives room to suppose it was fabricated after his time; probably by the monks of Basingwerk, whose convent was about half a mile distant from this well, but was not founded till the year 1312, above 124 years after Giraldus's journey.

This well lies at the bottom of three high hills, at the east end of the town of Holywell, called by the Welch Tre-fynnon, or the town of the well.

It is covered by a small Gothic building, said to have been erected by the Duchess of Richmond, mother of King Henry VII.; but by the frieze of the outside cornice, which is ornamented with monkeys and other grotesque figures, it seems of more ancient date.

Nothing can exceed the delicacy and elegance of the Gothic work, on the inside of this building, which forms a canopy over the well, having in the centre, and serving as origin to the Gothic arches, a circular shield, on which is carved a coat of arms, but at present not distinguishable. The walls were formerly painted; there is still remaining the portrait of St. Winifrid; here was likewise a niche for the Virgin Mary, but it is now empty.

The water of this well is extremely clear, the spring boils up like a cauldron, and as it turns a mill within a few yards from its rise, it must yield a great quantity of water, though by no means so much as the inhabitants pretend, who sell a printed paper, describing the wonderful qualities of the spring, wherein they estimate its delivery at an hundred tons per minute; this they pretend

was determined by an experiment made in the year 1731, by Mr. Price, then minister of Holywell, and several other gentlemen.

At the bottom of the well, are some stones spotted with red, which is shewn as the blood of St. Winifred. A gentleman who was educated in this town, says, he remembers a person being employed to paint the stones against the day of the commemoration of that saint, which is still observed by the Roman Catholics, on the 3d of November.

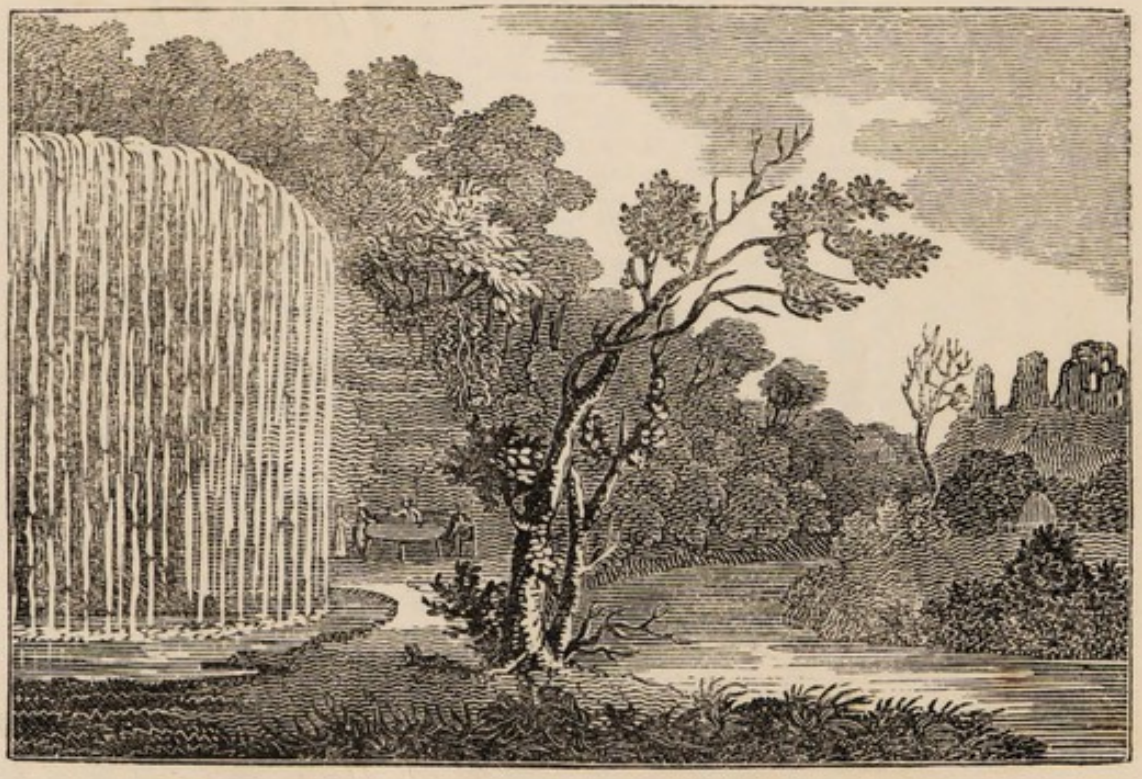
The well is an oblong square, about twelve feet long, and seven wide; the water passes through an arch into a small square court; under this arch the Catholics always swim, it being deemed an act of penitence.

The walls of this place, like those at Bath, are hung round with hand-barrows, crutches, and other monuments of its efficacy; and indeed it is not be doubted, that, in cases where cold-bathing was proper, many cures have been wrought, without the interposition of St. Winifred, or any miraculous virtue in the water.

Over this well is a room used for a school, and in it the justices hold the quarter-sessions.—GROSE'S *Antiquities.*

DROPPING WELL.

THE Dropping Well, at Knaresborough, in Yorkshire, is the most famous of all the petrifying waters in England. It drops from a porous rock, and the ground upon which it has fallen, for twelve yards long, is now changed into solid stone. A little rivulet, that runs from this well, falls into the Nid, where it has formed a rock that stretches some yards into the river.—SMITH'S *Wonders.*



DROPPING WELL AT KNARESBOROUGH.

MOUNTAINS.

TABLE MOUNTAIN.

TABLE MOUNTAIN, near Cape Town, is a stupendous mass of naked rock, which imposes an involuntary attention upon the most indifferent observer, and more peculiarly engages the contemplation of the mineralogist. It seems to have received its name from mariners, as these persons generally give the epithet of Table Land to every considerable eminence whose summit appears, to the spectator, in a parallel line with the horizon.

The northern front of the Table Mountain is a horizontal line, about two miles in length, and standing directly opposite to the town. The bold front that rises at right angles to meet this line, is supported by several projecting buttresses, which, rising from the plain, close in with the front, a little higher than midway from the base. These with the division of the front into three parts, (a curtain flanked by two bastions, the first retiring and the other projecting,) render the appearance of the mountain extremely similar to the dilapidated walls of some stupendous fortress.

The height of these seeming walls is 3,582 feet above the level of the adjoining bay; the eastern point is still bolder, and has one point considerably higher; to the west, the rock is rent into deep chasms, and worn away into various pointed masses; and about four miles toward the south, the mountain descends in successive terraces to a chain which extends entirely along the peninsula.

The two wings of the front, called the Lion's Head, and the Devil's Mountain, are, in fact, but disunited fragments of the Table Mountain. The height of the former is 2,160 feet; and that of the latter 3,315. The upper part of the Lion's Head is a circular mass of stone, which, from some points of view, exactly resembles a dome like that of St. Paul's cathedral, erected upon a lofty cone-shaped eminence; but the Devil's Hill is broken into a variety of irregular points.

Whoever surveys with an attentive eye the exact horizontal position of these three mountains, which are composed of multitudinous tabular masses, must be convinced that their origin was Neptunian, and that no convulsion of the earth has ever happened in this part of Africa, since their formation, sufficiently powerful to disturb the nice arrangement of their parts.

The ascent to the summit of the Table Mountain lies through a deep chasm, about three quarters of a mile in length, which divides the curtain from the left bastion. The perpendicular cheeks at the foot are above 1,000 feet high, and the angle of ascent is equal to forty-five degrees.

After quitting the romantic scenery of the chasm, and passing the portal, which forms two lines of natural perspective upon the summit, a stranger feels a momentary disgust at the tame and uninteresting plain extended before him; but this feeling invariably subsides when he perceives the astonishing command obtained by his elevation over surrounding objects.

On approaching the edge of the mountain—

> The weak brain turns, while down the craggy height
> The wondering traveller bends his aching sight;
> The seaman's lessen'd form astonished views,
> Or o'er the main some gliding bark pursues:
> Tho' far beneath, the sullen billows roar,
> Impetuous foam, and lash the sounding shore,
> The vast ascent the thundering noise repels,
> And on its head eternal silence dwells.

All the objects on the adjacent plain, are, in fact, diminished to insignificance in the eye of the spectator: the houses of Cape Town appear like childish fabrics composed of cards; the shrubbery on the sandy isthmus is merely visible; and the neighbouring farms, together with their enclosures, resemble a small picture held up at a distance.

On the summit of this mountain, the air is considerably lower in the clear weather of winter than in Cape Town; and in summer the difference is still greater, when the head of the mountain is enveloped by a fleecy cloud, not inaptly termed the Table-cloth.

BURNING MOUNTAINS.

JAPAN is remarkable for its burning mountains; particularly near Firando, there is a small rocky island, that has been burning and trembling for many centuries, and at a small distance from the coast is another, which has thrown out lava and other combustible matter at different intervals, for many ages. On the summit of a mountain in the province of Figo, a perpetual flame continually issues. Sometimes a black smoke, accompanied by a very disagreeable stench, is observed to issue from the top of a mountain called Feri. This mountain is said to be nearly as high as the peak of Teneriffe; but in shape and beauty, is supposed to have no equal, and its top is perpetually covered with snow. Unsen is a large though not very high mountain, near Timabra; its top is constantly bare, and of a whitish colour, from the sulphur upon it; and its smoke may be discerned at the distance of several miles. The earth is in several places burning-hot, and is so loose and spungy, that, except on a few spots, where trees grow, one cannot walk over it, without being in continual fear, from the crackling hollow noise perceived under foot. Its sulphurous smell is so strong, that, for the space of many miles round, there is not a bird to be seen; and when it rains, the water is said to bubble up, and the whole mountain to appear as if boiling.

We are informed by Dr. St. Clair, that on the side of one of the Apennines, between Florence and Bologna, there is a spot of ground about four miles in diameter, whence issues a constant flame, which rises very high, and gives a great heat, but without noise, smoke, or smell. In lasting and heavy rains it sometimes intermits, but rekindles with augmented heat and vigour. The doctor adds, that corn grows within a few yards of it; and he conjectures the flame arises from a vein of bitumen or naphtha. There are other fires of this kind upon the same mountains.—SMITH'S *Wonders*.

THE ANDES.

It is generally allowed, that the mountains of South America are not to be paralleled in any other part of the world, for their surprising height and extent; witness that prodigious chain of them called the Andes, which begins in the most northern part of Peru, and extends itself quite to the Straits of Magellan, a length of between three and four thousand miles. Acosta relates, that he once ascended the highest of these mountains in Peru, called Pariacaca; and that he went, prepared according to the best instructions he could get, with several more who had the like curiosity; but, notwithstanding all his precaution, when he came near the top he was seized with such pains that he thought he should have fallen to the ground; and, the rest of the company feeling similar emotions, they all hastened down as fast as they could, without waiting for one another. They were all taken with violent retchings, and not only brought up green phlegm and choler, but a great deal of blood.

This lasted for three or four hours, till they had descended to the lower part of the mountain; but it seems that the sickness generally goes off before they get to the bottom, and is attended with no ill consequences.

People who pass this ridge of mountains in any part of them, for upwards of 500 leagues, are affected in like manner, but more in some places than in others. Acosta had passed the Andes at four other different places, and always felt the like disorder, but not so much as at Pariacaca, and the best remedy they found against it was to stop their mouths, noses, and ears as much as possible, the air being so subtile and piercing, that it affects the entrails both of men and beasts. This indeed is no wonder, since the height of the Andes is such, that the Alps in comparison to them seem but as ordinary houses in regard to lofty towers. Hence our author concluded, that the air on the top of those mountains was too pure and subtile for animals to breathe in, they requiring a grosser medium; and this, he supposed, occasioned the above-mentioned disorder in the stomach.—Smith's *Wonders.*

PICHINCHA.

PICHINCHA was formerly a volcano, but the mouth on one of its sides, is at present covered with sand and calcined matter, and neither fire nor smoke is seen to issue from it. A learned author, Don George Juan de Ulloa, observes, that he found the cold on its top extremely intense, and the wind violent; they were also frequently involved in so thick a fog, or, in other words, a cloud, that an object at six or eight paces' distance was scarcely perceptible. The air grew clear, by the clouds descending nearer to the surface of the earth, when they, on all sides, surrounded the mountain to a vast distance, representing the sea, with the rock standing like an island in the centre. When this happened, they heard the dreadful noise of the tempests, that discharged themselves on the city of Quito, and the neighbouring country. Looking down, they saw the lightning issue from the clouds, and heard the thunder roll far beneath them. While the lower parts were involved in thunder and rain they enjoyed a delightful serenity; the wind was abated, the sky clear, and the enlivening rays of the sun moderated the severity of the cold. But, when the clouds rose, their thickness rendered respiration difficult, snow and hail fell continually, and the wind returned with all its violence; so that it was impossible to overcome entirely the fear of being, together with their hut, blown down the precipice, or of being buried in it, by the daily accumulations of ice and snow. Their fears were likewise increased by the fall of enormous fragments of rocks. Though the smallest crevice, visible in their hut, was stopped, the wind was so piercing, that it penetrated through; and, though the hut was small, crowded with inhabitants, and had several lamps constantly burning, the cold was so great, that every person was obliged to have a chafing-dish of coals, and several men were constantly employed every morning to remove the snow which fell in the night. By the severity of this cold, their feet were swelled, and grew so tender, that they could not walk without extreme pain; their hands also were covered with chilblains, and their

lips so swelled and chapped, that every motion in speaking made them bleed.—SMITH'S *Wonders.*

TAURUS.

ONE of the most celebrated mountains in Asiatic Turkey is a prodigious chain, which extends from the north parts of Armenia to the Mediterranean, and is called Taurus. This vast ridge consists of a great number of mountains, separated one from another by a valley, and called by some particular name. The highest of these mountains is Gordiani, to which the Armenians pay a great veneration, and which they suppose to be mount Ararat, where Noah's ark rested, and where they pretend to show some remains of it still preserved from corruption. The ascent to this mountain, according to M. Tournefort, is not only very difficult and fatiguing, but also dangerous, through the ruggedness of some parts, and the deep sands of others. The dreadful precipices which travellers are obliged to pass, strike even the guides themselves with horror; it rises to a prodigious height, and according to some travellers, may be seen at the distance of five days' journey. The upper part is continually covered with snow, and is for one half of the year entirely obscured by clouds.

Caucasus is another great chain of mountains, which extends from the Black Sea to the Caspian Sea, and is generally reckoned the highest and largest ridge of mountains in Asia; the passage over it being computed at 120 miles. The tops of these mountains are always covered with snow; but the lower parts are well-inhabited, produce honey, corn, wine, fruits, and gums; and abound with cattle and game:—the respective mountains are generally denominated from the different countries in which they are situated.

SALT MOUNTAIN.

NEAR Hallein, in the archbishopric of Saltzburg, is a high mountain, the earth whereof is mixed with a sort of

alum or salt-petre, which, being laid for three or four weeks in large trenches filled with fresh water, the earthy part subsides, and the water is then drawn off and boiled in iron pans, till it is quite evaporated and leaves the salt at the bottom. This mountain is pierced in a thousand places, so that guides are absolutely necessary to conduct strangers who have the curiosity to visit the subterraneous labyrinth, which is seldom done without much ceremony. Before they enter these works, they generally repair to a church upon the mountain, to perform their devotions, after which they breakfast at an adjacent public-house, and being furnished with proper dresses and other necessaries, every one takes a lighted candle or torch in his hand, and some of the guides go before and others behind, lest the strangers should be frightened or lose their way in the dismal caverns. The inspection of this place commonly takes up several hours. —SMITH'S *Wonders*.

MOUNT MISERY.

MOUNT MISERY is so called from an unfortunate man who, attempting to climb the precipice, fell backwards and was killed. It is the highest point of land on St. Christopher's, its height being reckoned a mile and a half perpendicular from the sea; but Mr. Smith thinks it not so high by a quarter of a mile. This vast mountain is situated in the middle of a long chain of lesser and lower ones, that run across the island; but, lofty as it is, our author thinks the Nevis mountain considerably higher.

The whole breadth of one part of the above-mentioned rim is taken up by a large single rock, in the form of a triangular pyramid, equilateral, and almost as smooth as if it had been cut by the chisel of a skilful workman. From angle to angle, at the base, it measures seven or eight yards, is somewhat blunted or broken off at the top, and a third part downward from thence it seems to be cracked quite through sideways. The colour of the rock resembles the red part of oriental granite, and like that it is so extremely hard, that a strong arm can scarcely make a visible impression on it with the point of a sharp

cutlass. This triangular pyramid on one side of the cavity, and Mount Misery on the other, each taking up the breadth of the rim, prevent a person's walking more than half-way round the circle.

MOUNT FUEGO.

Fuego is said to be 15 miles long, and is much higher than any other of the Cape de Verd islands; appearing, from the sea, like one single mountain, though, on the sides, there are some deep valleys. There is a volcano at the top which burns continually, and may be seen a great way off at sea. It vomits a great deal of fire and smoke, and throws out huge pieces of rock to a surprising height; sometimes, also, torrents of melted lava run down the sides.

In the south-east part of the island of Bourbon there is a volcano, which has long thrown out vast quantities of bitumen, sulphur, and other combustible materials; so that the country about it is entirely useless, and is called by the inhabitants *pays brule*, or burnt land.

PEAK OF TENERIFFE.

Teneriffe, one of the Canary islands, is very famous for its lofty mountain called the Peak, which rises like a sugar-loaf in the middle of the island, and may be seen at sea, in clear weather, at 120 miles' distance. Some authors make the height of this mountain 15 miles, and others three or four times that number, computing, undoubtedly, the winding ascent: but Varenius says, it is four miles five furlongs perpendicular, and Raimendus reckons it three miles only. Which of these accounts is nearest the truth we cannot determine, but perhaps it is that of Varenius. We may venture to say, that the Peak is one of the highest mountains in the world; but the best account of it is that given by several English merchants and others who had the curiosity to climb to the top of it,

as we find in the history of the Royal Society of London, published by Dr. Sprat, then bishop of Rochester; whereof the following is an extract:

They set out from Oratavia, a sea-port on the west side of the island, and passed over several bare mountains and sandy places, till they came to the foot of the Peak, where lie a vast number of huge stones, that seem to have fallen down from above. After they had ascended about a mile on horseback, they were obliged to alight, and climb the hill on foot; and, having traversed a steep black rock about a mile higher, they found the top of it as flat as a pavement. Here the air was very cold after sun-set, and they were forced to keep great fires all night. Next morning they proceeded to that part of the mountain called the Sugar-Loaf, which being steep, and the soil a deep white sand, it was very difficult travelling, though they were provided with shoes that had soles a finger broader than the upper-leather, to facilitate the passage. When they came near the summit they found a strong wind, and a continual breathing of a hot sulphurous vapour issued from the hill, which scorched their faces, and made them sore.

On the top there was a large basin or pit, shaped like an inverted cone, which was of considerable depth, and about musket-shot over. The inside of this cavity, or caldron, as it is called, is covered with small loose stones mixed with sand and sulphur, from whence issued a hot suffocating steam: and the footing being so bad, they did not descend into the pit above four or five yards, though some have ventured to the bottom. The brim of this pit, on which they stood, was not above a yard broad; and from hence they could clearly see the Grand Canary, Balma, Gomera, and even Ferro, which is 20 leagues distant. As soon as the sun appears, the shadow of the Peak seems to cover not only this and the Great Canary island, but even the sea to the very horizon, where it looks as if, being limited, it turned up into the air.

The same gentlemen relate, that there was a great deal of snow and ice about two-thirds of the way up, but at the top there was none at all; which doubtless is owing to the hot steam proceeding from the caldron and the upper parts of the mountain They mention a remarkable

cave, 10 yards deep and 15 broad, in shape like an oven or cupola, with a hole at the top, near eight yards over, through which their servants let them down by a rope till they came to a bank of snow. At the bottom of the cave there is a round well of water, exactly underneath the opening above, the surface whereof is about a yard lower than the snow, and its depth about six fathoms. This is not supposed to be a spring, but only snow blown in and dissolved, or water that drops from the rocks, and is there collected. About the sides and roof of this grotto, there were icicles hanging down to the snow. They met with no trees or shrubs in their passage but pines, and among the white sands, a bushy plant like broom.

A physician, who lived upon the island of Teneriffe twenty years, gives it as his opinion, that the whole island being impregnated with brimstone, formerly took fire, by the violence of which great part of it was blown up, there appearing about the island several mountains of huge calcined stones, that must have had their origin from such subterraneous commotions. He farther supposes, that the greatest quantity of sulphur lying about the centre of the island, the shock was there the most violent, and occasioned the rising of the Peak to its present prodigious height; and this appears from the vast number of calcined rocks that lie at the bottom of it for three or four miles round. From the Peak to the south-west, as far almost as the shore, are still to be seen the tracts of the rivers of brimstone and melted ore which ran that way, and have so ruined the soil, where they flowed, that broom is now its only production. The doctor adds, that in the south-west part of this island, there are high mountains of a bluish earth, and stones with a crust on them like that of copper and vitriol, and that there are several springs of vitriolic water.

In the year 1704, there happened a most dreadful earthquake in the island of Teneriffe, which began on the 24th of December, and increased till the 31st, when the earth opened, and two volcanoes were formed, which cast up so many burning stones as made two considerable mountains: and the combustible matter thrown up by these new volcanoes kindled above forty fires in the neighbouring places.

On the 5th of January, the air was darkened with ashes and smoke, the terror increased, and towards the evening the country was all in a flame for above a league in extent. This was the effect of another volcano, which had broke out towards Oratavia, with at least thirty mouths within the circumference of a quarter of a league. In a word, whole towns were swallowed up or overturned, many thousands of people lost their lives, and the torrents of sulphur and metallic matter thrown out by these volcanoes, converted a great part of a fruitful country into a barren desert.

In addition to the above particulars, we shall transcribe an account of the crater of this extinguished volcano, and of some experiments made on its brink, by M. Mongey, on the 24th of August, 1785, which perhaps may not prove unacceptable to our readers.

The crater of the Peak of Teneriffe (says this gentleman), is a true sulphur-pit, similar to those of Italy. It is about 50 fathoms long, and 40 broad, rising abruptly from east to west. At the edges of the crater, particularly on the under side, are many spiracles, or natural chimneys, from which there exhale aqueous vapours and sulphurous acids, which are so hot as to make the thermometer rise from nine to thirty degrees of Reaumur. The inside of the crater is covered with yellow, red, and white argillaceous earth, and blocks of lava partly decomposed. Under these blocks are found eight-sided rhomboidal crystals of sulphur, which are, probably, the finest that have ever been found. The water that exhales from the spiracles is perfectly pure, and not in the least acid, as appeared from several experiments.

The great elevation of the Peak above the level of the sea, induced me to make several chemical experiments, in order to compare the phenomena with those that occur in our laboratories. I shall here confine myself merely to the results.

The volatilization and cooling of liquors were here very considerable: for half a minute was sufficient for the dissipation of a pretty strong dose of ether. The action of acids on metals, earths, and alkalies, was slow; and the bubbles which escaped during the effervescence were much larger than ordinary. The production of vitriols

was attended with very singular phenomena: that of iron assumed all at once a beautiful violet colour, and that of copper was suddenly precipitated of a very bright blue colour. I examined the moisture of the air by means of the hygrometer, of pure alkali and of vitriolic acid, and I thence concluded, as well as from the direction of the aqueous vapours, that the air was very dry; for at the end of three hours, the vitriolic acid had suffered hardly any change, either in colour or weight: the fixed alkali remained dry, except near the edge of the vessel that contained it, where it was a little moist; and Saussure's hygrometer pointed to sixty-four degrees, as nearly as the impetuous wind which then blew would enable us to judge.

Liquors appeared to have lost nothing of their smell or strength at this height; a circumstance which contradicts all the tales that have been hitherto related on this head: volatile alkali, ether, and spirit of wine, retained all their strength: the smoking spirit of Boyle was the only one that seemed to have lost any sensible portion of its energy. Its evaporation, however, was not the less quick; for in thirty seconds, a quantity which I had poured into a cup was entirely volatilized, and nothing remained but the sulphur, which tinged the rim and the bottom. When I poured the vitriolic acid on this liquor, there happened a violent detonation, and the vapours that arose had a very sensible degree of heat. I tried to form volatile alkali, by decomposing sal-ammoniac with the fixed alkali; but the production was slow and hardly sensible, while at the level of the sea, this process made with the same substances succeeded very readily and in abundance.

As I was curious to investigate the nature of the vapours that exhale from the crater, and to ascertain whether they contained inflammable air, fixed air, and marine acid, I made the following experiments: I exposed on the edge of one of the spiracles a nitrous solution of silver in a cup; it remained upwards of an hour in the midst of the vapours which were continually exhaling, but without any sensible alteration; which sufficiently proved that no vapours of marine acid exhaled from the crater. I then poured into it some drops of marine acid, where a precipitation of luna cornea immediately ensued, but

instead of being white, as it generally is, it was of a dark violet colour, which soon became grey, and assumed the form of small scaly crystals. I think myself justifiable in attributing this alteration of colour to the vapours of inflammable air, according to some experiments that I have made on the precipitation of luna cornea in such air. Lime-water, exposed for three hours on the margin of the crater, and near a spiracle, was not covered with any calcareous pellicle, nor even hardly with any filmy appearance; which seems to prove, not only that no vapours of fixed air exhale from the crater, but that the atmospheric air which rests upon it, contains very little of that air, and that the inflammable vapours and sulphurous acids alone are sensible and considerable. The electricity of the atmosphere was pretty considerable; for Saussure's electrometer, when held in the hand at the distance of about five feet, indicated about three degrees; while on the ground it pointed only to one and a half.—SMITH's *Wonders.*

HISTORY OF THE WEATHER,

OR

LIST OF SEASONS,

FOR UPWARDS OF ONE THOUSAND YEARS.

THERE has been a great deal said, and particularly in the early part of the year 1819, about our country having undergone great changes in a long series of years; and many of our readers have doubtless heard from their elder friends, that they had another kind of sun and moon in their youth. The best answer to these querulous speculations may be found in the list of the seasons for about 1,700 years, which we now subjoin. It is taken

from a German book, Offeffer's *History of Climates and their Changes.*

It is very difficult to ascertain the precise condition of the weather in distant ages. The thermometer was not invented till 1590, by the celebrated Sanctorio; nor was that valuable instrument reduced to a correct standard before the year 1724, by the skill of Fahrenheit. We have hence no observations of temperature which go further back than a century. Prior to this period, we must glean our information from the loose and scanty notices which are scattered through the old chronicles, relative to the state of the harvest, the quality of the vintage, or the endurance of frost or snow in the winter. Great allowance, however, should be made for the spirit of exaggeration, and the love of the marvellous, which infect all those rude historical monuments. Toaldo and Pilgram have, with incredible industry, prosecuted this research; and, from a bulky work of the latter, printed in the German language at Vienna, in 1788, we shall select the most remarkable passages concerning the state of the weather, for more than a thousand years back, and combine with them the observations made by Professor Pfaff, of Kiel. The following years are noted for the severity of the winter:

In A. D. 401, the Black Sea was entirely frozen over.

In 462 the Danube was frozen, so that Theodomer marched over the ice, to avenge his brother's death in Swabia.

In 545, the cold was so intense in winter, that the birds allowed themselves to be caught by the hand.

In 763, not only the Black Sea, but the Straits of the Dardanelles was frozen over. The snow in some places rose fifty feet high; and the ice was so heaped in the cities, as to push down the walls.

In 800 the winter was intensely cold.

In 822 the great rivers of Europe, such as the Danube, the Elbe, and the Seine, were so hard frozen as to bear heavy waggons for a month.

In 860, the Adriatic was frozen.

In 874, the winter was very long, and severe. The snow continued to fall from the beginning of November to the end of March, and incumbered the ground so

much, that the forests were inaccessible for the supply of fuel.

In 891, and again in 893, the vines were killed by the frost, and the cattle perished in their stalls.

In 991, the winter lasted very long, with extreme severity. Every thing was frozen, the crops totally failed, and famine and pestilence closed the year.

In 1044, great quantities of snow lay on the ground; the vines and fruit trees were destroyed, and famine ensued.

In 1067, the cold was so intense, that most of the travellers in Germany were frozen to death on the roads.

In 1124, the winter was uncommonly severe, and the snow lay very long.

In 1133, it was extremely cold in Italy; the Po was frozen from Cremona to the sea; the heaps of snow rendered the roads impassable, the wine casks were burst, and even the trees split, by the action of the frost, with immense noise.

In 1179, the snow was eight feet deep in Austria, and lay till Easter. The crops and vintage failed, and a great murrain consumed the cattle.

The winters of 1209 and 1210 were both of them very severe, insomuch, that the cattle died for want of fodder.

In 1216, the Po froze 15 ells deep, and wine burst the casks.

In 1234, the Po was again frozen, and loaded waggons crossed the Adriatic to Venice. A pine forest was killed by the frost at Ravenna.

In 1236, the Danube was frozen to the bottom, and remained long in that state.

In 1261, the frost was most intense in Scotland, and the ground bound up. The Categat was frozen between Norway and Jutland.

In 1281, such quantities of snow fell in Austria as to bury the very houses.

In 1292 the Rhine was frozen over at Breysach, and bore loaded waggons. One sheet of ice extended between Norway and Jutland, so that travellers passed with ease; and in Germany, 600 peasants were employed to clear away the snow, for the advance of the Austrian army.

In 1305, the rivers in Germany were frozen; and much

distress was occasioned by the scarcity of provisions and forage.

In 1316, the crops wholly failed in Germany. Wheat, which some years before sold in England at sixpence a quarter, now rose to two pounds.

In 1323, the winter was so severe, that both horse and foot passengers travelled over the ice from Denmark to Lubeck and Dantzic.

In 1339, the crops failed in Scotland, and such a famine ensued, that the poorer sort of people were reduced to feed on grass, and many of them perished miserably in the fields. Yet in England wheat was at this time sold so low as three shillings and fourpence a quarter.

In 1344, it was clear frost from November to March, and all the rivers in Italy were frozen over.

In 1392, the vineyards and orchards were destroyed by the frost, and the trees torn to pieces.

The year 1408 had one of the coldest winters ever remembered. Not only the Danube was frozen over, but the sea between Gothland and Zeland, and between Norway and Denmark; so that wolves driven from their forests came over the ice into Jutland. In France, the vineyards and orchards were destroyed.

In 1423, both the North Sea and the Baltic were frozen. Travellers passed from Lubeck to Dantzic. In France, the frost penetrated into the very cellars. Corn and wine failed, and men and cattle perished for want of food.

The successive winters of 1432, 1433, and 1434, were uncommonly severe. It snowed forty days without interruption. All the rivers of Germany were frozen; and the very birds took shelter in the towns. The price of wheat rose in England, to twenty-seven shillings a quarter, but was reduced to five shillings the following year.

In 1460, the Baltic was frozen, and both horse and foot passengers crossed over the ice from Denmark to Sweden. The Danube likewise continued frozen two months; and the vineyards in Germany were destroyed.

In 1468, the winter was so severe in Flanders, that the wine distributed to the soldiers was cut in pieces with hatchets.

In 1544, the same thing happened again, the wine being frozen into solid lumps.

In 1548, the winter was very cold and protracted. Between Denmark and Bostock, sledges drawn by horses or oxen travelled over the ice.

In 1564, and again in 1565, the winter was extremely severe over all Europe. The Scheldt froze so hard, as to support loaded waggons for three months.

In 1571, the winter was severe and protracted. All the rivers in France were covered with hard and solid ice, and fruit trees, even in Languedoc, were killed by the frost.

In 1594, the winter was so severe, that the Rhine and the Scheldt were frozen, and even the sea at Venice.

The year 1608 was uncommonly cold, and snow lay of immense depth even at Padua. Wheat rose, in the Windsor market, from thirty-six shillings to fifty-six shillings a quarter.

In 1621 and 1622, all the rivers of Europe were frozen, and even the Zuyder Zee. A sheet of ice covered the Hellespont, and the Venetian fleet was choked up in the Lagoons of the Adriatic.

In 1655, the winter was very severe, especially in Sweden. The excessive quantities of snow and rain which fell, did great injury in Scotland.

The winters of 1658, 1659, and 1660, were intensely cold. The rivers in Italy bore heavy carriages; and so much snow had not fallen at Rome for several centuries. It was in 1658 that Charles X. of Sweden crossed the Little Belt over the ice, from Holstein to Denmark, with his whole army, foot and horse, followed by the train of baggage and artillery. During these years the price of grain was nearly doubled in England; a circumstance which contributed among other causes, to the Restoration.

In 1670, the frost was most intense in England and in Denmark, both the Little and Great Belt being frozen.

In 1684, the winter was excessively cold. Many forest trees, and even the oaks in England, were split by the frost. Most of the hollies were killed. Coaches drove along the Thames, which was covered with ice eleven inches thick. Almost all the birds perished.

In 1691, the cold was so excessive, that the famished

wolves entered Vienna, and attacked the cattle, and even men.

The winter of 1695 was extremely severe and protracted. The frost in Germany began in October, and continued till April, and many people were frozen to death.

The years 1697, and 1699 were nearly as bad. In England, the price of wheat, which, in preceding years had seldom reached thirty shillings a quarter, now amounted to seventy-one shillings.

In 1709, occurred that famous winter, called, by distinction, the cold winter. All the rivers and lakes were frozen, and even the seas, to the distance of several miles from the shore. The frost is said to have penetrated three yards into the ground. Birds and wild beasts were strewed dead in the fields, and men perished by thousands in their houses. The more tender shrubs and vegetables in England were killed; and wheat rose in price from two pounds to four pounds a quarter. In the south of France, the olive plantations were almost entirely destroyed, nor have they yet recovered that fatal disaster. The Adriatic sea was quite frozen over, and even the coasts of the Mediterranean about Genoa; and the citron and orange trees suffered extremely in the finest parts of Italy.

In 1716 the winter was very cold. On the Thames, booths were erected, and fairs held.

In 1726, the winter was so intense, that people travelled in sledges across the Strait from Copenhagen to the province of Scania, in Sweden.

In 1729, much injury was done by the frost, which lasted from October till May. In Scotland, multitudes of cattle and sheep were buried in the snow; and many of the forest trees in other parts of Europe were killed.

The successive winters of 1731, and 1732, were likewise extremely cold.

The cold of 1740 was scarcely inferior to that of 1709. The snow lay eight or ten feet deep in Spain and Portugal. The Zuyder Zee was frozen over, and many thousand persons walked, or skated on it. At Leyden, the thermometer fell ten degrees below the Zero of Fahrenheit's scale. All the lakes in England froze, and a whole ox was roasted on the Thames. Many trees were killed by the frost; and postilions were benumbed on their

saddles. In both the years 1709, and 1740, the General Assembly of the Church of Scotland ordained a national fast to be held, on account of the dearth which then prevailed.

In 1744, the winter was again very cold. The Mayne was covered seven weeks with ice; and at Evora, in Portugal, people could not creep out of their houses for heaps of snow.

The winters, during the five successive years, 1745, 1746, 1747, 1748, and 1749, were all of them very cold.

In 1754, and again in 1755, the winters were particularly cold. At Paris, Fahrenheit's thermometer sunk to the beginning of the scale; and in England, the strongest ale, exposed to the air in a glass, was covered in less than a quarter of an hour, with ice an eighth of an inch thick.

The winters of 1766, 1767, and 1768, were very cold all over Europe. In France the thermometer fell six degrees below the Zero of Fahrenheit's scale. The large rivers, and most copious springs in many parts, were frozen to the bottom. The thermometer laid on the surface of the snow at Glasgow, fell two degrees below Zero.

In 1776, much snow fell, and the cold was intense. The Danube bore ice five feet thick, below Vienna. Wine froze in the cellars, both in France and in Holland. Many people were frost-bitten, and vast multitudes both of the feathered and of the finny tribes perished. Yet the quantity of snow which lay on the ground had checked the penetration of the frost. Van Swinden found, in Holland, that the earth was congealed to the depth of twenty-one inches, on a spot of garden which had been kept cleared, but only nine inches at another place near it, which was covered with four inches of snow.

The successive winters of 1784, and 1785, were uncommonly severe, inasmuch, that the Little Belt was frozen over.

In 1789, the cold was excessive; and again in 1795, when the Republican armies of France over-ran Holland.

The successive winters of 1799, and 1800, were both very cold.

In 1809, and again in 1812 the winters were remarkably cold.

The years which were extremely hot and dry, will be more easily enumerated.

In 763, the summer was so hot, that the springs dried up.

In 870, the heat was so intense, that near Worms, the reapers dropt dead in the fields.

In 993, and 994, it was so hot and dry, that in Germany the pools of water disappeared, and the fish, being left to stink in the mud, bred a pestilence.

In 1022, the heat was so excessive, that both men and cattle were struck dead.

In 1130, the earth yawned with drought. Springs and rivers disappeared, and even the Rhine was dried up in Alsace.

In 1159, not a drop of rain fell in Italy, after the month of May.

The year 1171 was extremely hot in Germany.

In 1232, the heat was so great, especially in Germany, that it is said that eggs were roasted in the sands.

In 1260, many of the Hungarian soldiers died of excessive heat at the famous battle fought near Bela.

The consecutive years 1276, and 1277, were so hot and dry, as to occasion a great scarcity of fodder.

The years 1293, and 1294, were extremely hot; and so were likewise 1303, and 1304, both the Rhine and the Danube having dried up.

In 1333, the corn-fields and vineyards were burnt up.

The years 1393, and 1394, were excessively hot and dry.

In 1447, the summer was excessively hot.

In the successive years, 1473, and 1474, the whole earth seemed on fire. In Hungary one could wade across the Danube.

The four consecutive years, 1538, 1539, 1540, and 1541, were excessively hot, and the rivers dried up.

In 1556, the drought was so great, that the springs failed. In England wheat rose from eight shillings to fifty-three shillings a quarter.

The years 1615, and 1616, were very dry over Europe.

In 1646 it was extremely hot.

In 1652 the warmth was very great, the summer being the dryest ever known in Scotland; yet a total eclipse of

the sun had happened that year, on Monday the 24th of March, which hence received the appellation of *Mirk Monday*.

The summer of 1679 was remarkably hot. It is related, one of the minions of tyranny, who, in that calamitous period harassed the poor presbyterians in Scotland with captious questions, having asked a shepherd in Fife, whether the killing of the notorious Sharp, archbishop of St. Andrews, (which had happened in May) was murder; he replied, that he could not tell, but there had been fine weather ever since.

The first year of the eighteenth century was excessively warm; and the two following years were of the same description.

It is a singular circumstance, that in 1718, at the distance precisely of 100 years from the present, the weather was extremely hot and dry all over Europe. The air felt so oppressive, that all the theatres were shut in Paris. Scarcely any rain fell for the space of nine months, and the springs and rivers were dried up. The following year was equally hot. The thermometer at Paris rose to 98 degrees, by Fahrenheit's scale. The grass and corn were quite parched. In some places, the fruit trees blossomed two or three times.

Both the years 1723, and 1724, were dry and hot.

The year 1745 was remarkably dry and hot, but the following year was still hotter, insomuch, that the grass withered, and the leaves dropt from the trees. Neither rain nor dew fell for several months; and, on the Continent prayers were offered up in the churches, to implore the bounty of refreshing showers.

In 1748 the summer was again very warm.

In 1754 it was likewise extremely warm.

The year 1760 and 1761, were both of them remarkably hot; and so was the year 1763.

In 1774, it was excessively hot and dry.

Both the years 1778, and 1779, were warm and very dry.

The year 1788 was also very hot and dry; and of the same character was 1811, famous for its excellent vintage, and distinguished by the appearance of a brilliant comet.

HOLY LAND.

JERUSALEM, according to Josephus, was the capital of Melchisedek's dominions, called *Salem* in the book of Genesis; and the Arabs assert, that it was built in honour of Melchisedek by twelve neighbouring princes. No satisfactory account is given of it, however, till the time of King David, who wrested it from the Jebusites, and made it the capital of his kingdom.

From this time it flourished under the peculiar blessing of the Deity, till the iniquity and ingratitude of the Jews provoked their Divine Patron to pour out his judgments upon them, and to give his holy city into the hands of the heathen. It was first reduced, in the days of Joash, by Hazael, king of Syria, who massacred all the nobility, but did not destroy the city. It was afterwards taken by Nebuchadnezzar, king of Babylon, who destroyed it, and carried the inhabitants into captivity. Seventy years after this event, it was rebuilt by permission of Cyrus, king of Persia; and it continued to be the capital of Judea (though frequently suffering from the monarchs of Syria and Egypt) till the time of Vespasian, emperor of Rome, when our Saviour's awful predictions were accomplished in its utter destruction.

It was rebuilt by Adrian, and seemed likely to have recovered something of its former grandeur; being surrounded with walls, and adorned with several handsome buildings. But this appears to have been a short-lived change; for when the Empress Helena, mother of Constantine the Great, visited the city, she found it in a most ruinous condition. Having formed a design of restoring it to its pristine lustre, she ordered all the rubbish that had been thrown upon Mount Calvary to be removed, and caused a magnificent church to be built, which enclosed several of the scenes of our Redeemer's sufferings.

The vile apostate Julian formed a design of re-building the temple of Jerusalem, and of restoring the Jewish worship, in order to give the lie to the prophecies of our

blessed Lord, that the temple should be totally destroyed, without one stone being left upon another, and that the city should be trodden down of the Gentiles till the times of the Gentiles were fulfilled. In this impious attempt, however, the emperor was frustrated, by a partial earthquake and fiery eruption, which totally destroyed the work, consumed the materials that had been collected, and killed a great number of the workmen.

Jerusalem continued in the hands of the eastern emperors till the time of the caliph Omar, who reduced it under his dominion. It remained subject to the Saracens till the year 1099, when it was taken by the crusaders, and made the capital of a Christian kingdom, which subsisted about 88 years, but was, at length, overthrown by Saladin, sultan of Egypt. And in 1217, the Saracens were expelled by the Turks, who are its present masters.

In its most flourishing state, Jerusalem was divided into four parts, each enclosed within its own walls, *viz.*, 1. The old city of Jebus, on Mount Zion, which became the residence of David and his successors, and was therefore called "The City of David." 2. The lower city, called "The Daughter of Zion," on which stood the two magnificent palaces which Solomon built for himself and his queen; that of the Maccabean princes; the strong citadel built by Antiochus to overlook the temple; and the stately amphitheatre, built by Herod, capable of containing 80,000 spectators. 3. The new city, which was chiefly inhabited by merchants, artificers, and tradesmen; and, 4. Mount Moriah, in which was built the famous temple of Solomon; and that erected by the Jews on their return from Babylon, and afterwards built almost anew, and sumptuously adorned by Herod the Great.

At present, however, Jerusalem is a poor and thinly-inhabited town, about three miles in circumference, situated on a rocky mountain, with steep ascents on all sides except the north, and surrounded by a deep valley, which is again encompassed with hills at a moderate distance. The private buildings are very mean, the streets narrow, and several of them full of ruins. It must likewise be observed, that the situation of the present Jerusalem is very different from that of the ancient city; for Mount Calvary, which was formerly appropriated to the execution of ma-

lefactors, was shut out of the walls as a polluted place, whereas since our Saviour's suffering upon it, the reverence paid to it by the Christians has occasioned such an alteration, that it now stands almost in the centre of the city, and, on the contrary, Mount Zion, the most eminent part of old Jerusalem, is now left without the walls. In short, the only thing that renders Jerusalem considerable in the present day, is the great resort of pilgrims thither; and the accommodating them with provisions seems to be the principal business of the inhabitants.

It is against Easter that the Christian pilgrims repair to Jerusalem in the greatest numbers, to attend the religious solemnity of that season in the church of the Holy Sepulchre.

The length of this church, which is built upon Mount Calvary, is about a hundred paces, and its width sixty, having at the west end of it a square tower or steeple, which appears rather ruinous; but the edifice in general is kept in good repair, and looks sumptuous and majestic. The nave or body of the church is round, and has two circular galleries, one above another, supported by large square pillars, formerly faced with white marble. Here are several Mosaic pictures in concave niches, representing prophets, apostles, &c., and among the rest are the figures of the Emperor Constantine, and his mother Helena, the foundress of the building. This part of the church is covered with a dome, sustained by rafters of cedar, having an opening at top, through which it receives a sufficient light. Exactly under this aperture is the holy sepulchre, which, at first, was a cave under ground, but the rock about it having been cut away, it is now considerably above the pavement of the church, and is hewn into the form of a chapel. Pilgrims are forced to creep into this chapel or grotto, the entrance being not above a yard high; but within it is about eight feet square, and as much in height, all cut out of the solid rock, and lined with white marble. The tomb wherein our Lord is supposed to have been laid, is raised in form of an altar, almost three feet from the floor, extending the whole length and half the breadth of this little chapel, so that there is not room for above three persons to kneel without much inconvenience. A great number of lamps,

which are kept here continually burning, make the place excessively hot; but the smoke escapes by vent-holes cut through the roof, over which there is a small canopy covered with lead, supported by six double Corinthian columns. The outside of the chapel is likewise adorned with ten beautiful pillars of white marble, adjoining to the wall, and sustaining a cornice.

The choir of this church is not unlike that of our cathedrals. It is separated from the nave by a wall, which has a door opposite to that of the holy sepulchre; and to the east it terminates in a semicircle, where the high altar stands, which is richly gilt, and hung round with the pictures of several saints, painted full-faced, after the manner of the Greeks, to whom the choir belongs; but the privilege of saying mass in the chapel of the holy sepulchre is confined to the Latins. A dome of free-stone covers this choir, which is close at top, rough-cast on the outside, and supported by large pillars.

Several parts of this church are distinguished by the name of holy places, and looked upon with more than ordinary veneration as having some particular actions done in them relating to the sufferings, death, burial, or resurrection of our blessed Saviour; and each of these sacred places has its respective altar. One of these is called the Chapel of Derision, wherein is an altar sustained by two pillars, and underneath it a piece of greyish marble, on which they say the soldiers placed our Saviour when they crowned him with thorns, and mocked him, saying, Hail, King of the Jews.

The chapel of the prison is another, being a little dark place, wherein they say our Lord was confined whilst things were preparing for his crucifixion, and where the Greeks keep a lamp continually burning. Another of the holy places is a particular part of Mount Calvary, about 12 yards square, which is left much higher than the floor of the church, having steps to go up to it; and here they pretend to show the very place where our Saviour was nailed to the cross.

This chapel is covered all over with mosaic work; and in the middle of the pavement are some marble stones of several colours, designed to point out the spot where our Lord's blood fell when his hands and feet were pierced.

Here are two altars, before which hang sixteen lamps, and a candlestick with twelve branches.

In an adjoining chapel the rock rises above the floor in form of an altar, which is covered with white marble, and in the middle of it is a round hole, about seven inches in diameter, and two feet deep, which is affirmed to be the very same wherein the foot of the cross was fixed, on which Christ suffered; and just by we see a cleft in the rock, which is evidently genuine and natural, and said to be made by the earthquake which happened at that time. This hole is now plated with silver, and on each side of it the places where the two thieves were crucified are represented by two crosses fixed on little marble pedestals

The stone of unction is about seven feet long, and two broad, adorned all round with a chequered border of white and red marble, and enclosed within iron-rails, to prevent its being trod upon. It is so called, as being supposed to be the very spot where the Redeemer's body was anointed, and prepared with aloes for the burial. To these might be added several other holy places, as that where the soldiers divided our Saviour's garments; where he appeared to Mary Magdalen after his resurrection, &c., all which things are supposed to have been transacted within the narrow limits of this sacred structure.

If any one (says Le Brun) be desirous to know the sensations of a person who kneels, for the first time, before the sepulchre of our Lord, I can only answer, for my own part, that I never felt so much affected in my life. A monk who visited the sacred tomb with me, and who had never before been at Jerusalem, was so agitated, and shed so many tears, that two full hours elapsed before he could be brought to himself again. I will not, from thence, conclude, that this was indisputably the place of Christ's sepulture; but as no serious person can approach this spot without meditating upon the sufferings of him who died for the sins of mankind, his soul must of necessity be very deeply affected. And although we live in an age in which numbers seem to glory in their infidelity, I am firmly of opinion, that the most professed atheist, with all his affected stupidity, could not forbear feeling the same emotions with myself upon such an occasion.

Every day a procession is made in the church of the

Holy Sepulchre, in which the monks carry tapers and crucifixes, and sing hymns; but in the holy week before Easter, when the pilgrims flock to Jerusalem, this is performed with extraordinary solemnity.

On Good Friday, all the most material circumstances of our Saviour's passion are represented; such as crowning him with thorns, nailing him to the cross, and then taking the body down, and laying it in the sepulchre. The monks have first a sermon, and then every one takes a lighted taper and a crucifix in his hand to begin the procession. They visit first the pillar of flagellation; next the prison; afterwards the altar of the division of Christ's garments, and the chapel of derision, from whence they proceed to Mount Calvary, leaving their shoes at the bottom of the stairs.

A pious fraud is performed every Easter-eve, by the Greek priests, which it would be unpardonable to pass over in silence. This is a pretended miraculous flame, which descends into the holy sepulchre, and kindles all the lamps and tapers without human assistance. On entering the church upon one of these occasions, Mr. Maundrell found a multitude of people running round the holy sepulchre, in a tumultuous manner, and exclaiming with the utmost vehemence, "Huia! Huia!—That is he! that is he!" Having wearied themselves with their running and vociferation, they performed a thousand antic tricks, dragging and carrying each other, and rolling about in the most indecent manner.

This riotous scene lasted about four hours, at the expiration of which, a procession set out round the sepulchre, and a profusion of standards, streamers, and crucifixes, were ostentatiously displayed. Towards the end of the procession, a pigeon came fluttering into the cupola over the sepulchre, at which the people redoubled their shouts and clamours. The suffragan of the Greek patriarch and the principal Armenian bishop then opened the door of the sepulchre, and, having caused all the lights to be extinguished, shut themselves in. As the accomplishment of the miracle drew nearer, the acclamations were increased, and the crowd pressed eagerly forward to light their candles at the holy flame as soon as it was produced.

In a few moments after the bishops had been shut up, the glimmering of the holy fire was seen through the chinks of the door, and, soon after, the two prelates came out, with blazing torches in their hands, while the people thronged about them to light their tapers. The mob now testified the most extravagant joy, and an illumination of the church concluded the ceremony.

Upon mount Moriah stands a Turkish mosque, which is frequently called the temple of Solomon, and is supposed to stand upon the same ground that was formerly taken up by the Holy of Holies. It is an octagonal building, covered with a cupola, and though it is neither a large nor elegant structure, it makes a grand appearance from the sole advantage of its situation. The Turks have enclosed the area where Solomon's temple formerly stood, and will not suffer a Christian, on pain of death, to go within its borders; but it may be distinctly viewed from the top of a house called Pilate's palace, and one may plainly see, that it must have cost immense labour to level such a spacious area upon so strong and rocky a mountain.

From this pretended palace of Pilate, wherein the Turkish sangiack now resides, begins what the Christians call the Dolorous Way, that is, the way that our Lord was led to Calvary, which is about a mile distant. In this journey we pass under an old arch that crosses the street, in the side of which is a window, where Pilate is said to have presented Christ to the people, saying, "Behold the Man:" and a little farther are shown the ruins of a church, built on the place where the Blessed Virgin is reported to have fallen into a swoon, on seeing her divine Son bearing his cross, and used with indignity. We likewise pass by the Gate of Judgment, through which malefactors were anciently led to the place of execution, and which stood in the western wall of Old Jerusalem, but is now considerably within the city.

Amongst other antiquities, they show an ancient building, which is made use of as a prison, and is the very same (they say,) from which St. Peter was delivered by an angel. About a furlong from thence, stands an old church belonging to the Greeks, said to have been erected by the pious Helena, upon the ground where the house

of Zebedee formerly stood, who, they tell us, was a fisherman, and used to bring fish from Joppa to Jerusalem. Where the house of Mark stood, to which St. Peter retired after his miraculous deliverance, the Syrians have a small church, wherein they boast of having a Syriac manuscript of the New Testament about 900 years old, and a stone font, which was used by the apostles.

It would be tedious to enumerate the pretended curiosities with which strangers are amused; and therefore we shall take leave of Jerusalem, after having mentioned a few particulars observable in its neighbourhood. Going out of the city, at the gate of Bethlehem, we see Bethsheba's Pool, as it is called, being supposed to be the same wherein the wife of Uriah was washing herself when David discovered her from the terrace of his palace. Passing by this pool, we enter the valley of Hinnom, on the west side whereof is the potters' field, or Aceldama, that is, the field of blood, being purchased by the thirty pieces of silver, the price of the innncent blood of our Saviour. At present it is called the Holy Field, on account of the veneration it has among Christians. The piece of ground is only about thirty yards long, and half as much in breadth, being now the burying-place of the Armenians. One half of it is taken up by a square fabric, near 12 yards high, over which are five openings, in the form of cupolas, large enough to let down a corpse, the flesh whereof it is said to consume in the space of 48 hours. The Christians in Jerusalem give implicit credit to this account; but Mr. Maundrell says, that looking through the holes at top, he could see many bodies under several degrees of decay; from whence he conjectures, that this grave does not make such quick despatch with the corpses committed to it as is commonly reported.

At a small distance from this field is a cave hewn out of the rock, consisting of several rooms one within another, where the apostles are said to have concealed themselves when they forsook their master, on his being apprehended in the garden. This cave was, perhaps, at first made for a sepulchre, and might afterwards serve for a hermitage; but it appears to have been formerly adorned with painting and gilding, and some pretend still to discern the pictures of several of the apostles.

In the valley of Jehoshaphat, is a well, or rather a dry pit, said to be the place from whence Nehemiah recovered the fire of the altar, which had lain hid there during the Babylonish captivity. On the same side of the valley is the pool of Siloam, whither our Saviour sent the blind man to wash, after having anointed his eyes with earth and spittle. About a furlong from hence is the fountain of the Blessed Virgin, to which there is a descent by several steps, the spring lying deep in the cavity of a rock. At no great distance from this place is the spot where Judas is said to have hanged himself after he had betrayed our Saviour; and a little farther, on the same side of the valley, are several Jewish monuments, two of which seem to be valuable antiquities, usually called the Sepulchre of Zacharias and the Pillar of Absalom.

The first of these, supposed to be that of Zacharias, who was slain between the temple and the altar, is cut out of a natural rock, and is of a quadrangular form, about six yards high, beautified with Doric columns, which support the cornice; and above that the roof rises in the shape of a pointed diamond. Absalom's pillar is lofty, and its sides and corners are adorned with Doric pilasters; but after it has run a little way in a square form, it changes into a round, and terminates in a point, the top being almost shaped like a bell. A great many stones lie near this monument, thrown there by Turks and Jews, as well as Christians, in detestation of Absalom's rebellion against his father.

The sepulchre of the Blessed Virgin is situated in the same valley, and was constructed at the expense of the empress Helena. That part of it above-ground is a square building, flat at the top; and on the south side of it is a door, from whence there is a descent of about fifty steps. When travellers are half way down, the guides shew them on the right hand the sepulchre of Anna, the mother of the Blessed Virgin, and on the left that of Joseph her husband. At the bottom of the stairs is a spacious church, walled on each side, and arched above with the natural rock. In the middle of the church is a little square chapel, faced with marble; and opposite to the door is the Virgin's tomb, in form of an altar, where the papists affirm that she was buried by the apostles.

The Turks, as well as Christians, have a great veneration for this place, and contribute to the charge of 18 lamps which are kept here continually burning. Each end of the church is semicircular, in one of which stands the great altar, upon which the light descends from a cupola above, and at the other end is a well of excellent water.

Mount Olivet, or the Mount of Olives, is the loftiest eminence in the neighbourhood of Jerusalem, and is held in extraordinary veneration both by Christians and Mahometans. Half way up the hill are several grottoes, called the sepulchres of the prophets; and a little higher is a subterraneous church, consisting of 12 arched vaults. On the top of this hill, from whence the Saviour of the world ascended into Heaven, the empress Helena caused a magnificent church and monastery to be erected, the greatest part whereof is now in ruins; but there is a little octagonal chapel still remaining, with a dome over it, sustained by eight pillars of white marble. This is called the chapel of the Ascension, and is at present in the possession of the Mahometans, who make Christians pay for admission to see a cavity in the rock, which they pretend is the print of one of our Saviour's feet.

Between the foot of mount Olivet and the brook Cedron, is shown the garden of Gethsemane, a piece of ground about 60 yards square, and planted with olive-trees of an uncommon size, which are said to be the same that grew in the time of our Saviour. At the upper end of the garden is a flat naked rock, where they say the Apostles fell asleep during our Lord's agony; and near this place is a grotto, wherein Christ is supposed to have undergone that bitter part of his passion, when his sweat resembled great drops of blood falling to the ground.

From Jerusalem it is usual to make an excursion to Bethlehem, which is now dwindled to a small village, but will be ever memorable as the birth-place of the Messiah, and, on this account, it is much resorted to by pilgrims. Here is a magnificent church, built over the very spot where our Saviour is supposed to have been born. We enter this edifice through a portico supported by sixteen pillars, and coming into the nave or body of the church, we find its lofty roof, which is of cedar, supported by four rows of marble columns. The choir is

large, and terminates in a semicircle, where stands the high altar; and on each hand are two other divisions, with their respective altars. A noble cupola, leaded on the outside, and adorned within with mosaic figures, covers this part of the church; and near the great altar are two flights of marble steps, leading into the chapel of the Nativity, where there is an altar, with several lamps continually burning before it. Descending a few steps lower, we are shown the manger where our Lord was laid, which is hewn out of the rock, about two feet high from the floor, and is lined with white marble.

At a little distance from the Latin convent is the grotto of the Virgin, held in great veneration, on account of a tradition that the Virgin Mary hid herself there with her divine son, to avoid the fury of Herod, whilst Joseph made the necessary preparations for their departure into Egypt. It is of a circular form, cut out of a chalky rock, and has an altar in it, where mass is sometimes celebrated.

About four miles south of Bethlehem are those famous fountains or pools, said to have been the contrivance and delight of Solomon. They are three in number, one above another, and so disposed, that the waters of the uppermost descend into the second, and those of the second into the third. Their form is quadrangular, and each of them about 90 paces broad; but with respect to their length they are somewhat different. They are very deep, and lined all round with a wall, except where the natural rock makes it unnecessary; and indeed it must be acknowledged they are a work not unworthy of that wise prince whose name they bear, and contain such a store of excellent spring-water, as perhaps cannot be found in any other part of Palestine. The remains of an aqueduct, which conveyed water from hence to Jerusalem, are still to be seen, being a sort of coarse marble stones, perforated and let into one another after the manner of pipes, and for their better preservation, covered over with a case or arch of smaller stones, cemented together with a very durable mortar; and yet as strong as this work has been, the Turks and Arabs have so destroyed it, that though it formerly extended five or six leagues, there are only some fragments of it remaining.

Nazareth, which is celebrated in the Scriptures, as having been the place of our Saviour's residence, previously to his entering on the great work of his ministry, contains some objects worthy of attention. Adammanus, a writer of the seventh century, tells us, that in his time there were two great churches to be seen at Nazareth, one of which was built upon two arches, in the place where our Saviour's house had stood. The second was built on the spot where the angel Gabriel revealed to the Blessed Virgin the mystery of Christ's incarnation; and we are assured that the church of the incarnation is still in being.

Mr. Maundrell observes, that there is a convent built over what is said to be the place of annunciation; for the chamber where Mary received the angel's salutation was removed from Nazareth, (according to the Popish legends,) and transported, by angels, to Loretto in Italy.

Mariti tells us, that in the eastern part of the city stands a church dedicated to the Blessed Virgin; and that the zeal of the Cenobites raised it from the ruins of that which had been destroyed by the Saracens. It is a very handsome building, and consists of three naves; in the middle of which is the principal altar, ornamented with magnificent iron balustrades.

The descent to the grotto, or annunciation-chapel, is by steps of beautiful marble, cut with great taste; and at the entrance are two columns of oriental granite, which seem intended both to support and ornament the grotto. The altar of this subterraneous chapel is very elegant, and the different kinds of marble with which it is ornamented, receive an additional lustre from the light of several silver lamps. On solemn festivals, the walls and pilasters are hung with various pieces of superb tapestry, representing the mysteries of the Blessed Virgin.

In the western part of the city stands a Christian church, supposed to occupy the site of the ancient synagogue where our Blessed Master showed the Jews the accomplishment of the prophecies in his own person. In this neighbourhood may be seen a fountain of excellent water, which the Christian inhabitants conjecture to have been used by the Virgin; and at some distance is a large round stone, called "Christ's Table," from a tradition

that he sometimes came thither to eat bread with his disciples.

The Mountain of Forty Days, situated in the plain of Jericho, is one of the highest in Palestine, and one of its most sacred places; as it derives its name from the rigorous fast which Christ observed after having triumphed over the vanities of the world, and the powers of hell.

The summit of this mountain is covered neither with shrubs, turf, nor earth; but consists of a solid mass of white marble, the surface of which has become yellow by the injuries of the air. "The path by which you ascend to it," says the Abbe Mariti, "fills one with terror, as it rises, with a winding course, between two abysses, which the eye dares scarcely behold. This path is at first tolerably broad; but at length it becomes so extremely narrow, that it is almost impossible to place both feet upon it at the same time. When we had ascended a little higher, we found an Arab stretched on the path, who required a certain toll for our passage. Here a traveller needs courage. One of the parapets, or paths, being broke, we clung to the remaining part, until we reached a small grotto, which gave us an opportunity of recovering our breath. On resuming our progress, we became exposed to more imminent danger; for, being almost suspended from the rock, and having before our eyes all the horror of the precipice, we could advance only by dragging one foot after the other; so that if the smallest fragment had given way under us, we must inevitably have been hurried to the bottom.

"Proceeding a little farther, we found a second grotto, the entrance of which was about three yards broad; and it would be very capacious, were not two-thirds of it filled up by part of the roof, which had tumbled in. This grotto conducts to another, which our curiosity induced us to enter; but we were almost stifled by the number of bats that were fluttering about in it. Being desirous of retreating almost as soon as we had entered, the bats flew about us in such a manner as to almost cover our bodies; but they luckily made themselves a passage, and suffered us to breathe with freedom.

"By the glimmering light which reached this grotto, we perceived that the bottom of it was covered to the

height of about four inches with the excrements of the bats; and we remarked some niches in the sides, which gave us reason to conclude, that it had once served as a sepulchre to the ancient anchorets. This is the more probable as the other grotto appears, by the remains of an altar, and some Greek paintings, to have been formerly used as a church.

"In the right corner there is a large cistern, the plaster of which retains its original solidity, though broken in a few places; and in the left corner is a small staircase, leading to a third grotto. This is much longer and broader than either of the former, and its walls are ornamented with Greek paintings of the twelve apostles as large as life. But their figures are so much changed, that they could scarcely be distinguished, were it not that their names are written in Greek characters upon the glory which surrounds their heads. At the farther end of the grotto stands a square altar, above which is an oval painting of the annunciation, in good preservation. No writer has been able to tell us who was the founder of these curious chapels; but it is evident that the chisel has been employed to render the grottos smooth and regular; and it appears that they were inhabited by a number of hermits, who devoted themselves to a life of retirement and holy meditation.

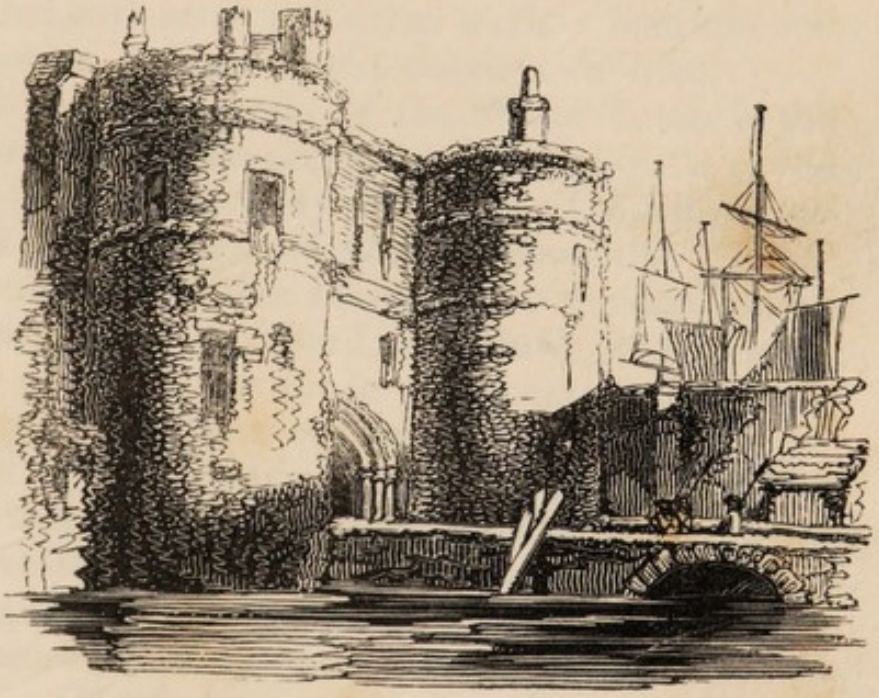
"In remembrance of our Saviour's miraculous fast, a chapel was formerly erected on the summit of the mountain, which may be seen from the plain; but we could not approach it, as the path was almost entirely destroyed. It may be accessible, however, on the other side of the mountain, which we did not visit. Here we enjoyed the most beautiful prospect that can be imagined; for this eminence overlooks the mountains of Arabia; the countries of Ammon and Gilead, the plains of Moab and Jericho, the river Jordan, and the whole extent of the Dead Sea.

THE

TOWER OF LONDON.

Of the several fortresses in Great Britain, the most remarkable is the Tower of London, situated on the east side of that city, near the bank of the Thames. It was anciently a royal palace, and consisted of no more than what is now called the White Tower, which appears to have been first marked out by William the Conqueror, in the year 1076, and completed by his son William Rufus, who, in 1098, surrounded it with walls, and a broad deep ditch. Several succeeding princes made additions to it, and king Edward III. built the church. In the year 1638 the White Tower was rebuilt; and since the restoration of king Charles II. it has been thoroughly repaired, and a great number of additional buildings made to it. At present, besides the White Tower, here are the offices of ordnance; of the mint, of the keepers of the records, the jewel office, the Spanish armoury, the horse armoury, the new or small armoury, barracks for the soldiers, and several handsome houses; so that the Tower of London has at present more the appearance of a town than a fortress. Upon the wharf is a line of about sixty pieces of cannon, which are fired upon state holydays. On this side of the Tower the ditch is narrow, and over it is a draw-bridge: under the tower-wall, on the same side, is a water-gate, commonly called Traitor's Gate, because it had been customary to convey traitors and other state prisoners through it by water, to and from the Tower.

Parallel to the wharf, upon the walls, is a platform seventy yards in length, called the Ladies' Line, whence there is a fine prospect of the shipping, and the river Thames. From this line there is a walk round the Tower walls, on which are three batteries distinguished by the names of the Devil's Battery, the Stone Battery, and the Wooden Battery, each of which is mounted with several pieces of brass cannon.



TOWER OF LONDON.

The principal entrance to the Tower is by two gates, one within the other, on the west side, both large enough to admit carriages, and parted by a strong stone bridge, built over the ditch.

The principal officers of the Tower are a constable, a lieutenant, and a deputy-lieutenant.

Within the outer gate is the lion tower, in which is a fine collection of wild beasts, consisting of lions and lionesses, leopards, tigers, apes, jackals, and other wild animals, together with a great variety of birds: these animals are all regularly fed, and carefully attended.

In the first story of the White Tower is an armory for the sea-service, containing various sorts of arms, curiously laid up, for above ten thousand seamen; and the upper stories are filled with arms and other warlike instruments as spades, shovels, pickaxes, and chevaux-de-frize.

Near the south-west angle of the White Tower is the Spanish armory, being the depository of the spoils of the Spanish armada, fitted out by Philip II. of Spain, to invade England in the reign of Queen Elizabeth. It consisted of 132 ships, of which scarcely 70 returned home; and of 30,000 troops on board, of which 20,000 were either killed, drowned, or made prisoners in England. The trophies preserved here of this memorable victory are as follow:—A Spanish battle-axe, with a pistol in the handle and a match-lock; the Spanish general's halbert, covered with velvet, the nails are double gilt, and on the top is the pope's head curiously engraven. An engine called the Spanish morning-star, from its figure, which is that of a star. Of this kind of engine there were many thousands on board, all with poisoned points, designed to strike at the English in case they ventured to board the Spanish fleet. Thumb-screws, of which there were several chests full on board, intended to extort a confession from the English where their money was hid. A Spanish poll-axe, used in boarding of ships. Spanish halberts, or spears, some of which are curiously engraved, and inlaid with gold. Spanish spadas or long swords, poisoned at the points. Spanish cravats, consisting of engines of torture, made of iron, and put on board to lock the feet, arms, and heads together, of such as the Spaniards called English heretics. Bilboes, being instruments also made

of iron, for yoking the English prisoners two-and-two. Spanish shot, of which there are four different sorts—spike-shot, star-shot, chain-shot, and link-shot, all admirably contrived, as well for the destruction of the masts and rigging of ships, as for sweeping the men off the decks. The banner, with a crucifix on it, which was to have been carried before the Spanish general. An uncommon piece of arms, consisting of a pistol in a shield, contrived in such a manner that the pistol might be fired, and the body covered at the same time: it is to be fired by a match-lock, and the sight of the enemy taken through a little grate in the shield, which is pistol-proof. The Spanish rançeur, made in different forms, and intended either to kill the men on horseback, or to pull them off their horses; and on one of them is a piece of silver coin, which the Spaniards intended to have made current in England. The Spanish officers' lances, finely engraved and gilt. The common soldiers' pikes, eighteen feet in length, pointed with long sharp spikes, and shod with iron. The Spanish general's shield, which was to have been carried before him as an ensign of honour; upon which are depicted, in most curious workmanship, the labours of Hercules.

Here also are deposited several Danish and Saxon clubs, a sort of weapons which the Danes and Saxons are said to have used in their conquests of England; an instrument called King Henry VIII.'s walking-staff, with three match-lock pistols in it, and coverings to keep the charges dry; a large wooden cannon, called Policy, because, as is said, when King Henry VIII. besieged Bulloign, the roads being impassable for heavy cannon, he caused a number of these wooden ones to be made, and mounted on proper batteries before the town, as if real cannon, which so terrified the French commandant, that he gave up the place without firing a shot; and the axe with which Ann Bullen, the mother of Queen Elizabeth, and the Earl of Essex, the favourite of Queen Elizabeth, were beheaded.

The other curiosities in this place are, a train of little cannon, neatly mounted on proper carriages, being a present from the foundry of London to King Charles I. when a child, to assist him in learning the art of gunnery; wea-

ENTRANCE TO THE WHITE TOWER.

pons made with the blades of scythes, fixed straight to the ends of poles, and taken from the Duke of Monmouth's party at the battle of Sedgmoor, in the reign of James II.; the partizans that were carried at the funeral of King William III.; and a model of an admirable machine, the design of which was brought from Italy, by Sir Thomas Lombe, at the hazard of his life. The latter object of attention is a mill for the manufacture of silk, and was first erected in the year 1734, by Sir Thomas, at his own expense, in an island of the river Derwent, facing the town of Derby. It works three capital engines for making organzine, or thrown silk; has 26,586 wheels; and 97,746 movements, which are all worked by one water-wheel, that turns round three times in a minute. By every turn of the water-wheel, the machine twists 73,726 yards of silk thread, so that in twenty-four hours it will twist 318,496,320 yards; yet any single wheel or movement may be stopped, without impeding the rest; and the whole is governed by one regulator. This machine was thought of such importance by the legislature, that, on the expiration of the patent which Sir Thomas had obtained for the sole use of it during 14 years, the parliament granted him 14,000*l*., as a farther recompense for the hazard he ran, and the expense he had incurred, by introducing and erecting it, on condition that he should suffer a perfect model of it to be taken, in order to secure and perpetuate the invention.

Northward of the White Tower is a noble building, called the Grand Store-house, extending 245 feet in length, and 60 in breadth. It was begun by King James II. and finished by William III. who erected that magnificent room called the New, or Small Armory, to which there is a passage by a folding-door, adjoining to the east end of the Tower chapel, which leads to a grand staircase of easy ascent. On the left side of the uppermost landing is a workshop, in which are constantly employed about fourteen furbishers, in cleaning, repairing, and arranging the arms contained in this place; which are so artfully disposed, that at one view may be seen arms for nearly 200,000 men, all bright and fit for service at a moment's warning. Of the disposition of these arms no adequate idea can be formed by description; and there are a

thousand peculiarities in the disposition of so vast a variety which no description can reach.

Upon the ground-floor, under the small armory, is a large room of equal dimensions with that, supported by twenty pillars, all hung round with warlike implements. This room, which contains the royal train of artillery, is 24 feet high, and is full of the most dreadful engines of destruction; besides harness for horses, men's harness, drag-ropes, trophies of standards, colours, &c.

Eastward of the White Tower, is the Horse-armory, consisting of a plain brick building, in which are several curiosities.

Before the room-door is the figure of a grenadier in his accoutrements, as if upon duty, with his piece rested upon his arm. Within the room, on the left hand, are figures as large as life, of horse and foot, supposed to be drawn up in military order, to attend a line of kings on the other side of the room, shown in the following order: King George I. in a complete suit of armour, with a truncheon in his hand, seated on a white horse, richly caparisoned, having a fine Turkey bridle gilt, with a globe crescent, and star, velvet furniture laced with gold, and gold trappings. King William III. dressed in the suit of armour worn by Edward the Black Prince, at the battle of Cressy; he is mounted on a sorrel horse, whose furniture is green velvet, embroidered with silver, and holds in his right hand a flaming sword. King Charles II. dressed in armour, with a truncheon in his hand, seated on a fine horse, richly caparisoned, with crimson velvet, laced with gold. King Charles I. in a rich suit of gilt armour, curiously wrought, presented to him by the city of London, when he was Prince of Wales. James I. in a complete suit of figured armour, with a truncheon in his right hand. King Edward VI. in a curious suit of steel armour, whereon are depicted, in different compartments, a variety of scripture histories; he sits like the rest on horseback, with a truncheon in his hand. King Henry VIII. in his own armour, which is of polished steel, with the foliages gilt, and bearing a sword in his right hand. King Henry VII. who also holds a sword, and is seated on horseback in a complete suit of armour, finely wrought, and washed with silver. King Edward V. who with his brother Richard,

was smothered in the Tower, by order of their uncle and guardian Richard III.; and having been proclaimed king, but never crowned, a crown is suspended over his head: he holds a lance in his right hand, and is dressed in a rich suit of armour. King Edward IV. in a bright suit of armour, studded, with a drawn sword in his hand. King Henry VI., Henry V. and Henry IV. King Edward III. with a venerable beard, in a suit of plain bright armour, with two crowns on his sword, alluding to his having been crowned king both of England and France. King Edward I. dressed in a very curious suit of gilt armour, and in shoes of mail, with a battle-axe in his hand. And William the Conqueror, the first in the line, though the last shown, in a suit of plain armour.

The other principal curiosities in this room are a large tilting-lance of Charles Brandon, duke of Suffolk; a complete suit of armour, made for King Henry VIII. when he was but eighteen years of age, rough from the hammer; a small suit of armour made for King Charles II. when he was about seven or eight years of age, with a piece of armour for his horse's head; real coats of mail, called Brigandine jackets, consisting of small bits of steel, so artfully quilted one over another, as to resist the point of a sword, and perhaps a musket-ball, and yet so flexible, that the wearer may bend his body any way, as well as in an ordinary suit of clothes; an Indian suit of armour*, sent by the Great Mogul as a present to King Charles II.; the armour of John of Gaunt, Duke of Lancaster, the son of Edward III.; and a droll figure of one William Somers, said to have been jester to King Henry VIII.

Over the door of the armory, on the inside, is a target, on which are engraved the figures of Justice, Fortune and Fortitude; and the walls of the room are entirely lined with various pieces of armour for horses' heads and breasts, targets, and many pieces that now want a name.

About twenty yards east of the grand store-house, or new armory, is the Jewel-office: a dark stone room, in

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*This is reckoned a great curiosity, being made of iron quills, each about two inches long, finely japanned, and ranged in rows, one row easily slipping over another; these are bound together with silk twist, and are used in India as a defence against darts and arrows.

which the jewels of the crown are deposited. The jewels shown at this time are those following:

The imperial crown, with which it is pretended all the kings of England have been crowned, since Edward the Confessor, in 1342. It is of gold, enriched with diamonds, rubies, emeralds, sapphires, and pearls. The cap within is of purple velvet, lined with white taffety, turned up with three rows of ermine. The golden orb, or globe, put into the king's right hand, before he is crowned; and borne in his left, with the sceptre in his right, upon his return into Westminster-hall, after he is crowned at Westminster-abbey.

The globe is about six inches in diameter, edged with pearl, and enriched with precious stones. On the top is an amethyst of a violet colour, nearly an inch and a half high, set with a rich cross of gold, adorned with diamonds, pearls, and other jewels; the whole height of the ball is eleven inches.

The golden sceptre, with its cross set upon a large amethyst of great value, garnished round with table-diamonds. The top rises into a fleur-de-lis of six leaves, all enriched with precious stones; from whence issues a mound, or ball, made of the amethyst already mentioned. The sceptre with the dove, the emblem of peace, perched on the top of a small Jerusalem cross, finely ornamented with table-diamonds, and jewels of great value. St. Edward's staff, four feet seven inches and a half in length, and three inches three quarters in circumference, all of beaten gold, which is carried before the king at his coronation. The rich crown of state worn by his majesty in parliament, in which is a large emerald, seven inches round, a pearl, esteemed the finest in the world, and a ruby of inestimable value. The crown belonging to the Prince of Wales, which is carried together with the king's crown, as often as his majesty goes to the parliament-house, by the keeper of the jewel-office, attended by the warders, to Whitehall, where both crowns are delivered to the officers appointed to receive them, who, with some yeomen of the guard carry them to the robing rooms adjoining to the House of Lords, where his majesty and the Prince of Wales put on their robes. The king wears his crown on his head while he sits upon the throne; but

that of the prince is placed before him. As soon as the king is disrobed, the crowns are carried back to the tower, and again locked up in the jewel-office.

The crown, globe, and sceptre of Queen Mary, with the diadem she wore at her coronation with her consort William III. An ivory sceptre, with a dove on the top, made for the queen of James II., whose garniture is gold, enamelled with white. The curtana, or sword of mercy, the blade of which is thirty-two inches long, and nearly two broad, without a point, carried before the king at his coronation, between the two swords of justice. The golden spurs, and the armillas, or bracelets for the wrists, which though very antique, are worn at the coronation. The ampulla, or eagle of gold, which is finely engraved, and holds the holy oil the kings and queens of England are anointed with; and the golden spoon that the bishops pour the oil into. The eagle and spoon are pieces of great antiquity; the former, including the pedestal, is about nine inches high, and the wings expand about seven inches; the head of the eagle screws off about the middle of the neck, which is made hollow for holding the holy oil; and when the king is anointed, the oil is poured into the spoon out of the bird's bill.

A rich salt-seller of state, in the form of the square white tower; the workmanship is exquisitely fine: it is of gold, and used only on the king's table at the coronation. A noble silver font, doubly gilt, and elegantly wrought; in which the royal family are christened. And a large silver fountain presented to Charles II by the town of Plymouth, curiously wrought. Here also are deposited all the crown jewels worn by the princes and princesses at coronations, and an abundance of curious old plate.

SUPPOSED WEIGHT OF A FIRST-RATE MAN-OF-WAR.

A MAN in health consumes, in the space of 24 hours about eight pounds of victuals and drink, consequently 8,000 pounds of provisions are required daily in such a ship. Now let us suppose her to be fitted out for three

months only, and we shall find that she must be laden with 720,000 pounds of provisions. A large forty-two pounder weighs about 6,100 pounds if made of brass, and about 5,500 pounds if of iron; and generally there are 28 or 30 of these on board a ship of 100 guns, the weight of which, exclusive of that of their carriages, amounts to 183,000 pounds. On the second deck 30 twenty-four pounders, each of which weighs about 5,100 pounds, and therefore altogether, 153,000 pounds, and the weight of the 26 or 28 twelve-pounders on the lower deck, amounts to about 76,400 pounds, and that of the 14 six-pounders on the upper deck to about 26,600 pounds, and besides that, on the round tops, there are even three-pounders, and swivels. Now, if to this we add, that the complete charge of a forty-two pounder weighs about 64 pounds, and that at least upwards of 100 charges are required for each gun, we shall find this to amount nearly to the same weight as the guns themselves. In addition to this, we must reflect, that every ship must have, by way of providing against exigencies, at least another set of sails, cables, cordage, and tacklings, which altogether amount to a considerable weight. The stores, likewise, consisting of planks, pitch, and tow; the chests belonging to the officers and sailors; the surgeon's stores, and various other articles requisite on a long voyage; as also the small arms, bayonets, swords, and pistols, are no inconsiderable load; to which we must finally add, the weight of the crew, which is not very trifling; so that one of these large ships carries at least 2,162 tons burden, or 4,324,000 pounds, and at the same time is steered and governed with as much ease as the smallest boat.—*Contemplative Philosopher.*

EXPENSE OF BUILDING A FIRST-RATE MAN-OF-WAR.

A FIRST-RATE man-of-war has its gun-deck from 159 to 174 feet in length, and from 44 to 50 feet broad; contains from 1 313 to 1,882 tons; has from 706 to 800 men; and carries from 96 to 110 guns. This ship requires

about 60,000 cubic feet of timber, and uses 180,000 pounds of rough hemp in the cordage and sails for it. The ground on which the timber for a 74 gun-ship would require to grow, would be 14 acres. It requires 3,000 loads of timber, each load containing 51 cubic feet; 1,500 well-grown trees of two loads each, will cover 14 acres at 20 feet asunder; 3,000 loads of rough oak, at 2*s.* per foot, or 5*l.* per load will cost 15,000*l.*—MILLARD's *Cyclopedia.*

LAND-SAILING CARRIAGES.

THE carriage in which Mr. Slater a few years since went over land with despatches to the East Indies and traversed the Arabian deserts, went at the astonishing rate of twenty miles an hour, so that it was supposed from Alexandria it would reach Bassora in a few days. It was constructed with broad wheels, and impelled by sails in the same manner as a ship, and so contrived, that it went as close to the wind as any cutter; and carried swivels to guard against the wandering Arabs. When Mr. Slater first set off in this machine, the wind was fair and moderate, and he was accompanied many miles by a considerable number of persons, mounted on camels, and fleet horses, whom curiosity attracted; but, in some time, the wind freshening, the motion became so rapid, that they were obliged to give up the pursuit. At Alexandria several ingenious mechanics have improved upon this curious mode of progression, and it is said that machines are now contriving, which will travel even with more expedition, and yet with perfect security.

This curious machine is thus described by tne celebrated Bishop Wilkins.

The body of it being somewhat like a boat, moving upon four wheels, of an equal bigness, with two sails like those of a ship, there being some contrivance to turn and steer it by moving a rudder, which is placed behind the two hindmost wheels; and for the stopping of it, this must be done, either by letting down the sail, or turning it from the wind.

Similar inventions are frequently to be seen in Holland.

Little vessels for one or two persons go upon the ice, having sledges instead of wheels, and are driven with a sail. The bodies of them like little boats, are so constructed, that if the ice should break, they may yet safely carry a man upon the water, where the sail would be still useful for the motion of the boat.—Bishop Wilkins's *Mathematical Magic.*

BALLOONS.

No discovery has ever been made, which drew after it a more general admiration, or excited more extravagant hopes of utility to man, than that of aërostation. It was no sooner announced, than already in the imagination of many, countries were connected, and commercial intercourse maintained, with unheard of advantages, while philosophy was to receive vast treasures of new facts to extend her borders. How few of these great expectations, after a lapse of more than thirty years, have been realized; and how little has been added to the real knowledge or convenience of life, will be discovered from a review of the most interesting facts that the various voyages which have been performed have brought to light. Let it, at the same time, be duly observed, that the art is still in its infancy, and that the intimate, though not always soon discovered, connexion between one fact or one branch of knowledge and another, equally forbid us to consider in vain the exertions already made, or those which may yet be required, before any decisive advantages are derived from aërostation.

Of the various circumstances observed by aëronauts during their voyages, when the apprehensions of their safety has ceased, none impresses them so strongly as the stillness that reigns around; with some few exceptions they hear no wind, whatever may be its violence, nor perceive their motion, whatever may be its rapidity. To account for this, it must be considered, that the air is, with respect to them, at rest, for they move at the same rate with it. It is also remarkable that they never experience any sickness or giddiness. In one instance, the

aëronaut, after his descent, was affected with a temporary deafness, but the wet and cold which he had experienced, would probably have had the same effect upon him in a terrestrial journey. Difficulty of respiration has ever been an object of notice. Of all methods of travelling, that in a balloon appears to people in general to be the most unsafe; but this is a conclusion drawn from a cursory view of the subject; the accidents which have happened, particularly those which have terminated fatally, are extremely few in number, and may be attributed to the want of precautions which are easily observed; we have seen even that a rent of 50 feet long, in a Montgolfier, produced no disaster. It should also not be omitted, that voyages have been performed in all weathers, and at all seasons of the year, and that lightning which had been dreaded as a potent enemy, has never interposed; upon the whole, it appears probable, that a voyage in a balloon is not more likely to endanger the personal safety of an individual, than a voyage from England to Ireland on the sea.

The longest aëronatic excursion ever taken was by Blanchard and Chevalier de l'Epinard, from Lisle; they traversed a distance of 300 miles. The greatest height ever attained in this way, appears to have been by Morreau and Bertrand, who, from Dijon, ascended to the height of 13,000 feet.

The ascending power of a balloon is equal to the weight by which it is lighter than an equal bulk of common air. Every cubic foot of inflammable air may be considered equal to $3\frac{1}{6}$ drams avoirdupois, which is about one-sixth of the weight of common air. Hence, if the capacity ot a balloon be such that it contains 12,000 cubical feet of this gas, its ascending power may be estimated at 12,000 ounces; and therefore the aëronaut, with the boat, and all other appendages, must weigh less than this. An inflammable air-balloon, if twenty feet in diameter, will just suffice for a single person.

In a rarefied air-balloon, or Montgolfier, the air cannot be expected to be above one-third lighter than common air; and a machine of this sort must therefore be in that proportion larger than the other, to have an equal ascending power.

To witness the flight of a large balloon, has an effect upon the mind as difficult to describe as it is impossible not to feel. So spacious a globe, with the magnificence of the decorations, excite admiration; the apparently precarious situation of the adventurers, raises apprehension; a machine of such extraordinary dimensions, majestically making its way through a medium which is incapable of supporting a feather: impressions from all the sources combine to form a mingled sentiment of the deepest interest, unlike that produced by any other exhibition of art. Many have not been able to bear the spectacle without shedding tears, others have involuntarily lifted their suppliant hands to heaven, or fallen upon their knees; several have fainted, and at Lunardi's first ascent, a delicate female was so overcome by her feelings that she died upon the spot.—*Panorama of Science and Art.*

THE LIFE-BOAT.

MARINERS are indebted for this admirable invention to Mr. Greathead, an eminent boat-builder of South Shields. The boat measures 30 feet by 10, and resembles in form a common Greenland boat, but more flat in the bottom. The quantity of cork employed in the construction is about seven hundred weight, with which the boat is lined on the inside as well as outside of the gunwales, two feet in breadth; the seats being also filled with the same material. It is rowed by ten men, doubly banked, and steered by one at each end with oars, being alike in its form at both ends, and contrived so as not to sink in the sand. This boat draws very little water, and can carry twenty persons even when full of water. Being water-proof, and rendered buoyant by cork, it always keeps afloat, preserving its equilibrium without any danger of oversetting. It is able to contend against the most tremendous sea, having never failed, in a single instance, of conveying a ship's crew to shore in safety. The vessel, when complete and copper nailed, costs about 150*l.* This boat has exceeded every expectation. During the last eighteen years, not fewer than between 200 and 300 lives have been saved

at the entrance of the Tyne alone, which otherwise must have been lost; and in no instance has it failed. The first trial of this boat was in the year 1790; and in 1802, the Society of Arts rewarded the inventor with their gold medal, and 50 guineas for the invention.—MILLARD'S *Cyclopedia.*

DIVING-BELL.

THE Diving-Bell is a machine so contrived, that the diver is safely conveyed to any reasonable depth; and may stay more or less time under the water, as the bell is greater or less. It is most conveniently made in the form of a truncated cone, the smallest base being closed, and the larger open. It is to be poised with lead, and so suspended, that it may sink full of air, with its open basis downward, and as near as may be in a situation parallel to the horizon, so as to close with the surface of the water all at once.

Under this covercle the diver sitting sinks down with the included air to the depth desired; and if the cavity of the vessel can contain a tun of water, a single man may remain a full hour without much inconvenience, and at five or six fathoms deep. But the lower he goes, still the more the inclined air contracts itself, according to the weight of the water that compressed it; so that at 33 feet deep the bell becomes half full of water, the pressure of the incumbent water being then equal to that of the atmosphere; and at all other depths, the space occupied by the compressed air in the upper part of its capacity, is to the space filled with water, as 33 feet to the depth of the surface of the water in the bell below the common surface of it. And this condensed air, being taken in with the breath, soon insinuates itself into all the cavities of the body; and has no ill effect, provided the bell be permitted to descend so slowly as to allow time for that purpose.

When the English, in 1588, dispersed the Spanish fleet, called the Invincible Armada, part of the ships went to the bottom, near the Isle of Mull, on the western coast of Scotland; and some of these, according to the account of the Spanish prisoners, contained great riches. This

information excited, from time to time, the avarice of speculators; and gave rise to several attempts to procure part of the lost treasure. In the year 1665, a person was so fortunate as to bring up some cannon, which, however, were not sufficient to defray the expenses. Of those attempts, and the kind of diving-bell used in them, the reader will find an account in a work printed at Rotterdam in 1669, and entitled "*G. Sinclari Ars nova et magnæ gravitatis et levitatis.*" In the year 1680, William Phipps, a native of America, formed a project for searching and unloading a rich Spanish ship, sunk on the coast of Hispaniola; and represented his plan in such a plausible manner, that king Charles II. gave him a ship, and furnished him with every thing necessary for the undertaking. He set sail in the year 1683; but being unsuccessful, returned again in great poverty, though with a firm conviction of the possibility of this scheme. By a subscription promoted chiefly by the duke of Albemarle, the son of the celebrated Monk, Phipps was enabled, in 1687, to try his fortune once more, having previously engaged to divide the profit according to the 20 shares of which the subscription consisted. At first, all his labour proved fruitless; but at last, when his patience was almost entirely exhausted, he was so lucky as to bring up, from the depth of six or seven fathoms, so much treasure, that he returned to England with the value of 200,000*l.* sterling. Of this sum he himself got about 16,000*l.* others say 20,000*l.*, and the duke 90,000*l.* After he came back, some persons endeavoured to persuade the king to seize both the ship and the cargo, under a pretence that Phipps, when he solicited for his majesty's permission, had not given accurate information respecting the business. But the king answered, with much greatness of mind, that he knew Phipps to be an honest man, and that he and his friends should share the whole among them, had he returned with double the value. His majesty even conferred upon him the honour of knighthood, to shew how much he was satisfied with his conduct. We know not the construction of Phipps's apparatus; but of the old figures of a diving machine, that which approaches nearest to the diving-bell, is in a book on fortification, by Lorine, who describes a square box, bound round with

iron, which is furnished with windows, and has a stool affixed to it for the diver. This ingenious contrivance appears, however, to be older than that Italian; at least he does not pretend to be the inventor of it.

After various attempts at improvement in this macnine, by different people, succeeded Dr. Halley, whose bell may be sufficiently understood from the following account:—It was made of wood, containing about sixty cubic feet in its concavity, and was in the form of a truncated cone, whose diameter at the top was three feet, and at the bottom five. It was so loaded with lead, that it could go down in a perpendicular direction, and no other. In the top was a window to let in light, and likewise a cock to let out the hot air that had been breathed; and below, about a yard under the bell, was a stage, suspended by three ropes, each of which was charged with about one hundred weight to keep it steady. To supply air, the bell had a couple of barrels so cased with lead, as to sink when empty, each having a bung-hole in its lowest part to let in the water as the air in them condensed on their descent, and to let it out again when they were drawn up full from below. To a hole in the uppermost part of these was fixed a leathern trunk or hose, long enough to fall below the bunghole, and kept down by a weight, in such a way that the air in the upper part of the barrels could not escape, unless the lower ends of these hose were lifted up. These air barrels were made to rise and fall like two buckets in a well; by means of these bands fresh air was continually supplied from above, and it was done with so much ease, that two men, with less than half their strength, conld perform all the labour required. By an additional contrivance, it was found practicable for a diver to go out of the engine, to some distance from it, the air being conveyed to him in a continual stream by small flexible pipes.

Great improvements have been made in the diving-bell by Mr. Walker, Mr. Spalding, and several other mechanical gentlemen; yet it must be acknowledged, that with all these improvements, this very curious machine appears to have been outdone, in some respects, by an invention of the famous Cornelius Drebell, if all be true that we are told about it. He contrived not only a vessel

to be rowed under water, but also a liquid that would supply the want of fresh air. The vessel was made for King James I., and carried twelve rowers, besides the passengers. It was tried in the river Thames, and one of the persons who was in the vessel when the experiment was made, told it to another who gave an account of it to the ingenious Mr. Boyle. As to the liquor, Mr. Boyle assures us, he discovered by a physician, who married Drebell's daughter, that it was used as occasion required, when the air in the submarine boat was clogged by the breath of the company, and rendered unfit for respiration; at which time, by unstopping a vessel full of this liquor, he could presently restore to the troubled air such a quantity of vital parts, as made it useful again for a considerable time. The secret of this liquor Drebell would never disclose to more than one person, who communicated the preparation to Mr. Boyle: but that gentleman seems to doubt whether the virtues of the liquor were so effectual as reported.—*Pantologia*, and SMITH's *Wonders*.

ASBESTOS, AN INCOMBUSTIBLE MINERAL.

FROM this mineral was formerly manufactured a sort of cloth, and likewise paper, which was considered imperishable. Pliny says, he himself had seen napkins thereof which being taken dirty from the table after a feast, were thrown into the fire, and by that means were better scoured than if they had been washed in water. But the principal use, according to the same author, was for the making of shrouds for royal funerals, to wrap up the corpse, so that the ashes might be preserved distinct from those of the wood, whereof the funeral pile was composed: and the princes of Tartary, according to the account in the *Philosophical Transactions*, still use it at this day in burning their dead.

This mineral is met with in potstone or serpentine rocks, either dispersed through them or accumulated in their clefts and crevices, unmixed with any other substance. The most beautiful comes from Tarentaise, in

Savoy; it is in white flexible filaments, sometimes a foot long, of a pure silky lustre.

The shorter fibres, that are incapable of being woven, have been sometimes made into paper, the process of which is the same as that employed for common paper, except that a greater proportion of paste or size is required; after having been made red-hot, however, this paper becomes bibulous and brittle. The threads are also sometimes used as perpetual wicks for lamps; they require, however, to be cleaned occasionally from the soot, which collects about them, and the fibres in the hottest part of the flame are apt to run together, so as to prevent the due supply of oil.

LAMP WITHOUT FLAME.

It has been discovered, by Sir Humphrey Davy, that a fine platina wire, heated red-hot, and held in the vapour of ether, would continue ignited for some time. Mr. Gill has practically applied this discovery, in the formation of an alcohol lamp, on the following construction:— A cylindrical coil of thin platina wire is placed, part of it round the cotton wick of a spirit-lamp, and part of it above the wick, and the lamp to be lighted so as to heat the wire to redness; on the flame being blown out, the vapour of the alcohol will keep the wire *red-hot*, for any length of time, according to the supply of alcohol, and with a very small expenditure thereof, so as to be in constant readiness to kindle German fungus, or paper prepared with nitre, and by this means to light a sulphur-match, *&c.*, at pleasure.

The proper size of the platina wire is the hundredth part of an inch, which may be readily known by wrapping ten turns of the wire round a cylinder, and if they measure the tenth part of an inch, it will be right. A larger size will only yield a dull red light; and a smaller one is difficult to use.

About twelve turns of the wire will be sufficient, coiled round any cylindrical body, suited to the size of the wick of the lamp; and four or five coils should be placed on the

wick, and the remainder of the wire above it. A wick composed of twelve threads of the ordinary-sized lamp-cotton yarn, with the platina wire coiled around it, will require about half an ounce of alcohol to keep it alight for eight hours.

This lamp, while it affords a sufficient light to shew the hour of the night by a watch, and to perform many other useful services, does not disturb persons unaccustomed to keep a light burning in their bed-room. From its constantly keeping a uniform heat, and not requiring to be snuffed, like other lamps, it may prove a valuable acquisition to the chemist, for experiments on a small scale, where a long continuance of a gentle heat is desirable. Its peculiar safety, as not a spark can fall from it, and its being totally free from the unpleasant smoke and smell common to oil lamps, are an additional recommendation.—*Literary Journal, &c.*

KALEIDOSCOPE.

About two years ago, Dr. Brewster, of Edinburgh, obtained a patent for a new optical instrument, which he calls *Kaleidoscope*, from the Greek words, *a beautiful form to see.* It consists of two mirrors, inclined to each other in an angle of about 30°. The object looked at is coloured glass, contained between two parallel object-glasses, and the whole is fitted up like a small telescope, about eight inches long. Nothing can exceed the beauty of the objects it produces, and their changes are truly magical. The instrument is intended to assist jewellers, glass-painters, and other ornamental artists, in the formation of patterns, of which it produces an infinite number.

VELOCIPEDE, OR PEDESTRIAN'S ACCELERATOR.

The principle upon which this simple machine is constructed, seems to have been taken from the art of skating It will appear obvious, from inspecting the cut, that

the whole apparatus consists only of of a seat placed between two wheels, which are kept in motion by the feet acting on the ground, while a small guiding pole, held in the hand, regulates the movement, and adjusts the balance.

The invention of this travellers' assistant is Baron von Drais, a gentleman of the court of the Grand Duke of Baden; it was introduced into this country a few years since, by Mr. Johnson, No. 75, Long-Acre; and it continued for some time to engross much attention. For such as take excursions in parks, or who have an opportunity of travelling on level roads, these machines are said to be highly beneficial.

A person who has made himself tolerably well acquainted with the management of one, can, without difficulty, urge himself forward at the rate of eight, nine, or even ten miles per hour. In one account we are informed, that experiments have shown it to be easy to travel fifty miles per day on these German hobbies. The price, we are informed, varies from eight to ten guineas; and their whole weight does not exceed fifty pounds.

As one successful effort of genius frequently leads to another, so this German invention has stimulated several of our ingenious mechanics to attempt an improvement on the principle, the machinery, and the accommodation of the rider.—*Imperial Magazine.*

THE PHOSPHORIC FIRE, OR MATCH BOTTLE.

Take a piece of phosphorus, about the size of a pea, put it into a very small phial, and fill up the bottle with quick lime in powder. Set the bottle in the midst of some sand, contained in an iron vessel of any kind, and place the iron vessel over a gentle fire. The bottle should be loosely stopped with a cork, and while it is gradually warming, its contents should be occasionally stirred; but too great an access of air must be avoided, to prevent their catching fire. When the whole of the lime has become of a reddish yellow colour, the phosphorus may be considered as having combined with it, and the bottle may be taken from the fire. It should be kept

well corked, and opened as seldom, and for as short a time as possible. When a brimstone match is introduced into this composition, and stirred about a little, it will instantly be lighted.

Another mode of forming a fire bottle, consists in mixing one part of sulphur with eight of phosphorus. A match introduced into this composition, and then rubbed upon a piece of cork, or any similar substance, is immediately lighted by the friction.—*Panorama of Science and Art.*

THE CHEMICAL WEATHER-GLASS.

A BOTTLE or vessel of glass, about ten inches long, and three quarters of an inch in diameter, filled with a peculiar mixture, has been recently sold to answer the purpose of the barometer, by the changes which it exhibits according to the state of the weather. The following is stated by Wiegleb to be the mode of composing this fluid:

Two drachms of camphor, half a drachm of purified nitre, and half a drachm of muriate of ammonia, are to be pulverized and dissolved in two ounces of proof spirits. This composition is to be put into a glass vessel as above described, the mouth of which is to be covered with paper, or a piece of bladder, perforated with a needle.

The changes which appear in this composition are stated to be of the following nature:

If the weather promise to be fine, the solid matter of the composition will settle at the bottom of the tube, while the liquid is pellucid; but previous to a change for rain, the compound will gradually rise, the fluid will continue transparent, and small stars will be observed moving or floating about within the vessel.

Twenty-four hours before a storm, or very high wind, the substance will be partly on the surface of the liquid, apparently in the form of a leaf, the fluid in such case will be very turbid, and in a state resembling fermentation.

During the winter, small stars being in motion, the composition is remarkably white, and somewhat higher than usual, particularly where white frosts or snow prevail. On the contrary, in summer, if the weather be hot

and serene, the substance subsides closely to the bottom of the glass tube.

Lastly, it may be ascertained from what point of the compass the wind blows, by observing that the solid particles adhere more closely to the bottom, on the side opposite to that where the tempest arises.—*Panorama of Science and Art.*

THE TELEGRAPH.

The Telegraph, though brought into general use only by the circumstances arising from the French Revolution, is of great antiquity, and the principle appears to have been known from the earliest ages, as the ancient Greeks used signals to convey information to their distant friends. There is very little doubt that the intelligence of the burning of Troy was conveyed to Greece by means of telegraphic signals, as the event was known in that country very soon after it had happened. The Chinese, when they send couriers on the great canal, or when any great man travels there, make signals by fire, from one day's journey to another, to have every thing prepared. More barbarous nations used, formerly, to give the alarm of war, by fires, lighted on the hills, or rising grounds. Various modes have been adopted for communicating intelligence by signals for every letter in the alphabet, which are observed by telescopes, and repeated at the respective stations. Both day and night telegraphs have been proposed by different writers, and others have insisted on the adoption of a vocabulary in which every sign should represent a word instead of a single letter, as now practised.

The telegraph, set up by government in a chain of stations from the Admiralty to the sea-coast, consists of six octagonal boards; each of which is poised upon an axis in a frame. This is done, in such a manner, that the board can be either placed vertically, so as to appear with its full size to the observer at the nearest station, or it becomes invisible to him, by being placed horizontally; so that the narrow edge alone is exposed, which edge is invisible from a distance. These six boards make thirty-six changes by the most plain and simple working, and

would make many more, if more were necessary. By a change in the position of one of these octagonal boards, any letter may be made, and in certain portions, a variety of things may be signified, according to the will of the persons at the two extreme posts, employed in making the signals. Thus one board being in an horizontal position, and the others being short, or in a perpendicular situation, may denote the letter *a*; two only being in an horizontal position, may give the letter *b*; three in the same manner the letter *c*, and so on. As there may be as many changes with these boards as with the same number of balls, the letters of the alphabet may be made with ease, and a sufficient number of signals may be formed for extraordinary purposes.

The officers on board our East Indiamen have a very simple mode of communicating with each other, by means of a large board painted black, on which they write in large Roman letters; and, making a signal to speak, by firing a gun, immediately hoist the board. This being read, a gun is fired from the other ship, and their answer given in the same manner. In this way they easily correspond, as far as the best glasses enable them to see distinctly.—MILLARD'S *Cyclopedia, &c.*

THE STEAM-ENGINE.

THE steam-engine, which has of late years been applied with eminent success to various purposes, in the abridgment of labour, consists of a large cylinder or barrel, in which is fitted a solid piston, like that of the forcing pump. The steam, supplied from a large adjacent boiler, in forcing up the piston, opens a valve, through which cold water rushes, on the principle of the common pump, condenses the steam, and causes the piston to descend by its own weight. The action of the piston moves up and down a large beam, which communicates to other machinery the power of any number of horses, from one to two or three hundred. The principle of the steam-engine was discovered by the Marquis of Worcester, who published it, in his *Century of Inventions*, in the reign of Charles II. It was improved by Captain Savary, who obtained a

patent for it; and it has been since successively improved by Newcomen, Bolton, and Watt, of Birmingham, and others. The power of one of the engines constructed by Bolton and Watt, has been thus described, from actual experiment:

An engine, having a cylinder, of thirty-one inches in diameter, and making seventeen double strokes per minute, performs the work of forty horses working day and night, (for which three relays of 120 horses must be kept) and burns 11,000 pounds of Staffordshire coals per day. A cylinder of nineteen inches, making twenty-five strokes of four feet each per minute, performs the work of twelve horses working constantly, and burns 3,700 pounds per day. A cylinder of twenty-four inches, making twenty-two strokes of five feet, burns 5,500 pounds of coals, and is equivalent to the work of twenty horses.

Packets, and other vessels, impelled by the power of steam, have recently been brought into very extensive use, particularly in rivers and canals. The Americans have even constructed some large ships of war, to be impelled by steam.—HARTLEY'S *Principles of the Sciences.*

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APPENDIX:

CONTAINING

CURIOUS EXPERIMENTS,

CHEMICAL,

MECHANICAL, OPTICAL, AND ARITHMETICAL,

FOR THE

ENTERTAINMENT OF YOUNG PEOPLE.

Easy method of taking off a Perfect Copy from a Print or a Drawing.

TAKE a piece of clean lantern-horn, lay it upon the print or picture you wish to take off, then, with a crow-quill, dipped in Indian ink, draw every stroke of the out-line upon the horn; when dry, breathe upon that side of the horn whereon you have made your draught, three or four times, and clap it directly on a damp piece of clean white paper, with the drawn side downwards, then press-ing it hard with the palm of your hand, the drawing will stick to your paper, and the horn come off clean.

The Revivified Rose, a curious experiment.

TAKE a rose that is quite faded, and throwing some common sulphur on a chafing dish of hot coals, hold the rose over the fumes, and it will become quite white. Then dip it in a basin of water, and giving it to any one, tell him to put it in his box or drawer, and after locking it, to give you the key. Five or six hours after, return him the key to unlock his drawer, where, instead of the white rose he put in it, he will find one that is perfectly red

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To make an Image that shall always stand upright in a glass globe full of water.

MAKE the lower part of the image of a man of wax, and the upper part of wood; then paint the figure all over with oil colours, and put it into a suspended glass globe, which has an opening at bottom, having a foot cemented to it; after the figure is put in, then whichever way the globe is turned the image will stand upright in the middle.

Hydraulic Experiment, called the Miraculous Vessel

TAKE a vessel of about six inches in height, and three in diameter, and having a mouth of only a quarter of an inch wide; and in the bottom of the vessel make a number of small holes, of a size sufficient to admit a common sewing-needle.

Plunge the vessel into water, with its mouth open, and when it is full cork it, and take it out again; then as long as the vessel remains corked, no water will come out of it, but as soon as it is uncorked, the water will immediately issue from the small holes at the bottom.

It must be observed, however, that if the holes at the bottom of the vessel be more than one-sixth of an inch in diameter, or if they be too numerous, the experiment will not succeed; for, in this case, the pressure of the air against the bottom of the vessel, will not be sufficient to confine the water.

To procure three different coloured Liquids from one vegetable Infusion, merely by the Addition of three colourless Fluids.

Pour boiling water upon a little red cabbage sliced, and when cold, decant the clear infusion. Divide this infusion into three wine glasses. To one add a solution of alum; to the second a little solution of potash; and to the third a few drops of muriatic acid. The liquor in the first glass will become a purple; the second a bright green; and the third a beautiful crimson.

To make a person choose any Card you please, and to tell him the Card he has chosen.

Spread a pack of cards before any person in company, in such a manner that one of the pictured cards, or some other remarkable one only, shall be completely visible; then desire him to think of any card he pleases; and when he has made his choice, you may safely tell him that the pictured card is the one thought on, for as no other could strike his eye, it was scarcely possible for him to make a different choice; but if he should, you may pretend to have made some mistake, and, after a time, try the experiment with some other person in company.

Easy Methods of Secret Writing.

A LETTER of common business may be interlined, by writing with sal-ammoniac dissolved in water, or with the juice of a lemon, these letters will not be visible till they they are held by the fire; but a letter so written will in a short time discover itself, from the corroding acid, and moisture of the liquid. So a letter written with dissolved alum, will not be discernible till the paper is dipt in water.

Letters written with urine, goat's fat, or hog's lard, will not appear till dust is thrown upon them; and it was by this stratagem that Attalus obtained a victory over the Gauls; for having appointed a day for sacrifice, he writ backwards upon his hand, with goat's fat, *Regis Victoria;* so pulling out the entrails of the sacrificed beasts, he pressed them to his hand, and as the priest turned them up and down in the dust, the words soon appeared legible, and this pious fraud encouraged his soldiers so much, that it gave him the victory.

A letter may be written with the yolk of an egg, and when the letters are quite dry, the paper must be blackened all over with ink, and the confederate, by scraping the paper gently with a knife, will expose the letters written with the egg, while the rest of the paper continues black.

A letter may likewise be written with two inks, the secret one with common ink, made very faint, by mixing it with water, so that the writing will be scarce visible, and when it is dry, write an ordinary epistle made with ink of gun-powder, beat, and mixed with rain water, upon the first letter, and those will wash off, with a sponge dipt in galls, which will also blacken the first.

Ingenious Method of concealing a Letter in a Bottle.

TAKE the bladder of a hog, or a calf, blow it full up, then thoroughly dry and write upon it; then press out the air, and put it into a bottle, leaving the neck of the bladder above the neck of the bottle, and fill it with oil and cork it up, and the bladder will be so closely ex-

tended to all parts of the inside of the bottle that neither the writing nor the bladder will be visible.

Sympathetic Writing.

1. If a weak infusion of galls be used, the writing will be invisible till the paper be moistened with a weak solution of sulphate of iron. It then becomes black, because these ingredients form ink.

2. If a paper be soaked in a weak infusion of galls, and dried, a pen dipped in the solution of sulphate of iron will write black on that paper, but colourless on any other.

3. The diluted solution of gold, silver, or mercury, remain colourless upon the paper till exposed to the sun's light, which gives a dark colour to the oxides, or renders them visible.

4. Diluted prussiate of potash affords blue letters when wetted with the solution of sulphate of iron.

Ingenious Method of secret Writing, by means of corresponding spaces.

Take two pieces of pasteboard, or stiff paper, out of which cut a number of oblong figures, at different distances from each other, as in the following example. Keep one of those pieces for yourself, and give one to your correspondent; and when you are desirous of sending him any secret intelligence, lay the pasteboard upon a sheet of paper of the same size, and in the spaces which are cut out, write what you would have him to understand, and fill up the intermediate parts of the paper with something which makes with those words a different sense. Then when your correspondent receives this letter, by applying it to his pasteboard, he will be able to comprehend your meaning.

Example.

I shall be	much obliged to you, as reading	alone

engages my attention [at] present, if you will send me any of the [eight] volumes of the Spectator; I hope you will excuse [this] freedom, but for a winter s [evening] I [don't] know a better entertainment. If [fail] to return it soon, never trust me for the time to [to come.]

Note. A paper of this sort may be placed four different ways, either by putting the bottom uppermost, or by turning it over; by which means the superfluous words may be more easily adapted to the sense of the others. And in either of these cases, this will be found a very elegible cipher, being more free from suspicion than any other; but, in general, it will only do for short messages.

To make a Cone, or Paper Pyramid, move round a Table without springs.

MAKE a cone, or pyramid of paper, or any other light substance, and put a beetle, or some such small insect, privately under it; then, as the animal will naturally endeavour to free itself from captivity, it will move the cone towards the edge of the table, and as soon as it comes there, will immediately return for fear of falling; and by moving backwards and forwards in this manner, will occasion great diversion to those who are ignorant of the cause.

To make a Golden Ink for ornamenting Initial Letters, &c. on Vellum, Parchment, and Paper.

TAKE a certain quantity of the whitest and best gum arabic, reduce it to an impalpable powder in a brass mortar, dissolve it in strong brandy, and add to it a little

common water to render it more liquid. Provide some gold in a shell, which must be detached, in order to reduce it to a powder. When this is done, moisten it with the gummy solution, and stir the whole with your finger, or with a small hair brush; then leave it at rest for a night, that the gold may be better dissolved. If the composition becomes dry during the night, it must be diluted with more gum water, in which a little saffron has been infused; but care must be taken that the gold solution be sufficiently liquid to be employed with the pen. When the writing is dry, polish it with a dog's tooth.

Black Ink.

In soft water infuse some of the best galls, well powdered, keep them frequently stirred; put some logwood chips, and a little alum and gum arabic to the same, and keep the mixture in a warm place for about a fortnight or three weeks; and when strained, you will have an excellent black ink for all the common purposes of writing.

The proportion of galls must be about eight ounces to a quart of water, one ounce of logwood, and about the fourth of alum and gum arabic.

Red Ink.

For a quarter of an hour boil four ounces of Brazil wood in a quart of water, then add a little gum arabic, sugar candy, and alum; let the whole then boil a quarter of an hour longer, and when strained you will have a beautiful red ink, which may be preserved for a length of time, and will not change its colour by keeping.

Blue Ink.

Blue ink may be made by diffusing Prussian blue, or indigo, through strong gummy water.

Yellow Ink.

YELLOW ink may be made by a solution of gamboge in gum water. Also saffron, and what is called French, or yellow berries.

Green Ink.

GREEN ink is made by boiling sap-green in water, in which a little alum has been dissolved

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To make Writing appear of different Colours.

WRITE with the juice of violets, and draw a brush dipped in spirit of vitriol over one part of the writing, and a second dipped in spirit of hartshorn, or a solution of salt of wormwood dissolved in water, over another, and you will have red and green writing. By exposing this writing to the fire, it will become yellow.

Indian Ink for Drawing.

TAKE the kernels of the stones of apricots, and burn them in such a manner as to reduce them to powder, but without producing flame, which may be done by wrapping up a small packet of them in a cabbage leaf, and tying round it a bit of iron wire. Put this packet into an oven, heated in the same degree as that required for baking bread, and the kernels will be reduced to a sort of charcoal, with which the ink may be made similar to that brought from China.

Pound this charcoal in a mortar, and reduce it to an impalpable powder, which must be sifted through a fine sieve; then form a pretty thick solution of gum arabic in water, and, having mixed it with the powder, grind the whole on a stone, in the same manner as colourmen grind their colours. Nothing more is necessary, but to put the paste into some small moulds, formed of cards, and rubbed over with white wax, to prevent it from adhering to them.

In regard to the smell of the China ink, it arises from a little musk which the Chinese add to the gum water, and which may be easily imitated. The figures on the sticks are only the particular marks of the different manufacturers.

To make Diana's Tree.

Dissolve a little sugar of lead in water, and fill a phial with the solution; then pass a wire through the cork, and affix to the upper part of the wire a small bit of silver, or zinc, in such a manner that it may be immersed in the solution not far from its surface. Set the phial in some place where it may remain undisturbed, and in about 24 hours you will perceive the lead beginning to shoot round the wire. This process will continue going on slowly, till you have a beautiful metallic tree. If you have a wide mouthed phial, or glass jar, the experiment may be pleasingly diversified, by arranging the wire in various forms.

Curious experiment with a Syphon, called the Cup of Tantalus.

The syphon is a pipe made of tin or copper, bent at an angle, but generally about 70 to 80 degrees, in such a manner that one limb may reach down through the bung-hole of a cask to be emptied to its very bottom (as may very frequently be seen at the doors of liquor shops, &c.); the other leg should be the largest, so that when filled, it may contain a heavier body of fluid than that limb within the vessel.

A comical display of the properties of the syphon is seen in what is called the "Cup of Tantalus;" the designation of which is derived from fabulous history, wherein we are told that Tantalus, king of Phrygia, was condemned by Jupiter to suffer perpetual hunger and thirst, amidst a profusion of delicacies, which always receded when applied to his lips. To imitate this disappointment, a syphon, having its two limbs parallel and contiguous, is fixed into the middle of a cup double its height; one limb receiving the liquid at the bottom of the interior,

and the other discharging it through the centre of the bottom. Thus, when the outlet is stopped by means of a finger applied thereto, the cup may be offered, quite full to the person on whom the joke is to be practised, observing that the syphon will not act until the liquor in the cup exceeds the level of its bend, when the whole will be drawn through the tube. This whimsical contrivance is rendered yet more diverting by having the syphon so contrived, that its action may commence only when the cup is inclined a little, as is usual when a person is about to drink; and if only a small flower, &c. be at the bottom of the vessel, appearing merely as an ornament, but allowing the liquor to pass under its petals, &c., into a tube made through one of the handles, and brought under the bottom.

Optical Augmentation.

TAKE a large drinking-glass, of a conical figure, that is, small at bottom and wide at top, in which put a shilling, and fill the glass about half full with water; then place a plate on the top of it, and turn it quickly over, that the water may not get out. You will then see on the plate, a piece of the size of half-a-crown; and somewhat higher up, another piece of the size of a shilling.

This phenomenon arises from seeing the piece through the conical surface of the water at the side of the glass, and through the flat surface at the top of the water, at the same time: for the conical surface dilates the rays, and makes the piece appear larger: but by the flat surface, the rays are only refracted, by which the piece is seen higher up in the glass, but still of its natural size. That this is the cause, will be farther evident, by filling the glass with water, for as the shilling cannot be then seen from the top, the large piece only will be visible,

After you have amused yourself with this remarkable phenomenon, you may give the glass to a servant, telling him to throw out the water, but take care of the two pieces of money; and if he have no suspicion of the deception, he will not be a little surprised to find one piece only

Magic Squares.

A MAGIC square is a figure made up of numbers in arithmetical proportion, so disposed in parallel and equal ranks, that the sums of each row taken either perpendicularly, horizontally, or diagonally, are equal: thus—

Natural Square.

1	2	3
4	5	6
7	8	9

Magic Square.

2	7	6
9	5	1
4	3	8

Magic squares seem to have been so called, from their being used in the construction of talismans. It is probable, from this property in them, *viz.*, that the ranks, in every direction, make the same sum, appeared extremely surprising, especially in the more ignorant ages, when mathematics passed for magic, and because also of the superstitious operations they were employed in; for, according to the childish philosophy of those days, which ascribed virtues to numbers, what might not be expected from numbers so seemingly wonderful?

The magic square was held in great veneration among the Egyptians, and the Pythagoreans, their disciples, who, to add more efficacy and virtue to this square, dedicated it to the then-known seven planets divers ways, and engraved it upon a plate of the metal that was esteemed in sympathy with the planet. The square thus dedicated, was inclosed by a regular polygon, inscribed in a circle, which was divided into as many equal parts as there were units in the side of the square, with the names of the angles of the planet, and the signs of the zodiac written upon the void spaces between the polygon and the circumference of the circumscribed circle. Such a talisman, or metal, they vainly imagined would, upon occasion, befriend the person who carried it about him.

To make a Magic Square of 25 and 49 Numbers.

Square of 25 Numbers.

11	24	7	20	3
4	12	25	8	16
17	5	13	21	9
10	18	1	14	22
23	6	19	2	15

65 Each Rank

Square of 49 Numbers.

22	47	16	41	10	35	4
5	23	48	17	42	11	29
30	6	24	49	18	36	12
13	31	7	25	43	19	37
38	14	32	1	26	44	20
21	39	8	33	2	27	45
46	15	40	9	34	3	28

175 Each Rank.

Magic Square of 100 Numbers.

10	92	93	7	5	96	4	98	99	1
11	19	18	84	85	86	87	13	12	90
71	29	28	77	76	75	24	23	22	80
70	62	63	37	36	35	34	68	69	31
41	52	53	44	46	45	47	58	59	60
51	42	43	54	56	55	57	48	49	50
40	32	33	67	65	66	64	38	39	61
30	79	78	27	26	25	74	73	72	21
81	89	88	14	15	16	17	83	82	20
100	9	8	94	95	6	97	3	2	91

505 in a Rank.

Hydrostatical Experiment.

It is an axiom in hydrostatics, that every substance which *swims* on water, displaces so much of the water as is exactly equal to its own weight; whereas, when a substance *sinks* in water, it displaces water equal to its bulk.

Take a piece of hard wood, balance it accurately in a pair of scales with water; and then place it gently on the surface of the water, in a vessel exactly filled with that fluid, and it will displace a portion of the water, which will flow over the top of the vessel. If the wood be now taken out with care, it will be found, that the water in the scale will exactly fill the vacancy left by the wood.

The blind Abbess and her Nuns.

A BLIND abbess visiting her nuns, who were twenty-four in number, and equally distributed in eight cells, built at the four corners of a square, and in the middle of each side, finds an equal number in every row, containing three cells. At a second visit, she finds the same number of persons in each row as before, though the company was increased by the accession of four men. And coming a third time; she still finds the same number of persons in each row, though the four men were then gone, and had each of them carried away a nun with them.

Fig. 1.

3	3	3
3		3
3	3	3

Fig. 2.

2	5	2
5		5
2	5	2

Fig. 3.

4	1	4
1		1
4	1	4

Let the nuns be first placed as in Fig. 1., three in each cell: then when the four men have gotten into the cells, there must be a man placed in each corner, and two nuns removed thence to each of the middle cells, as in Fig. 2.; in which case there will evidently be still nine in each row; and when the four men are gone, and the four nuns with them, each corner cell must contain four nuns, and every other cell one, as in Fig. 3.; it being evident, that in this case also, there will be still nine in a row as before.

To make a solar Magic Lantern.

PROCURE a box of about a foot high, and eighteen inches wide, or such other similar dimensions as you shall think fit, and about three inches deep, Two of the opposite sides of this box must be quite open, and in each of

the other sides let there be a groove, wide enough to pass a stiff paper or pasteboard. This box must be fastened against a window, on which the sun's rays fall direct. The rest of the window should be closed up, that no light may enter.

Provide several sheets of stiff paper, which must be blacked on one side. On these papers cut out such figures as you shall think proper, and placing them alternately in the grooves of the box, with their blacked sides towards you, look at them through a large and clear glass prism, and if the light be strong, they will appear to be painted with the most lively colours in nature. If you cut one of these papers in the form of a rainbow, about three quarters of an inch wide, you will have a lively representation of that in the atmosphere.

This recreation may be farther diversified, by pasting very thin papers, lightly painted with different colours, over some of the parts that are cut out; which will appear to change their colours, when viewed through the prism, and to stand out from the paper at different distances, according to the different degrees of refrangibility of the colours with which they are painted.

For the greater convenience, the prism may be placed in a stand on a table, at the height of your eye, and made to turn round on an axis, that when you have got an agreeable prospect, you may fix it in that position. This experiment may be made at a trifling expense, and if properly conducted, will afford no small entertainment.

Curious Experiment with Lime-water.

FILL a glass tumbler half full of lime-water, then breathe into it frequently: at the same time stirring it with a piece of glass. The fluid, which before was perfectly transparent, will presently become quite white, and, if suffered to remain at rest, *real chalk* will be deposited.

To magnify small Objects, by means of the Sun's Rays let into a dark Chamber.

LET the rays of light that pass through a lens fixed in a window-shutter, be thrown on a large concave mirror, properly fixed in a frame. Then take a slip or thin plate of glass, and sticking any small object on it, hold it in the incident rays, at a little more than the focal distance from the mirror, and you will see, on the opposite wall, amidst the reflected rays, the image of that object, very large, and extremely clear and bright. This experiment never fails to give the spectator the highest satisfaction.

Curious Experiment with the Air-Pump.

FIX a small tin cup of *ether* within a large watch-glass, containing a little water, and place both under the receiver of the air-pump. The exhaustion of the receiver will cause one of the fluids to *boil*, and the other to freeze at the same instant.

To obtain the true Shape and Fibres of a Leaf.

THERE are numerous beauties in the skeletons or fibres of leaves; and it is at least a pleasing, if not an useful employment to collect all, or a part of their varieties, which may be done with decisive accuracy as follows.

Rub the back of it gently with any hard substance, so as to bruise the fibres, then apply a small quantity of linseed oil to their edges; after which press the leaf on white paper, and upon removing it, a perfectly correct representation of every ramification will appear, and the whole may be coloured from the original.

Alternate Illusion.

With a convex lens of about an inch focus, look attentively at a silver seal, on which a cypher is engraved. It will at first appear cut in, as to the naked eye; but if you continue to observe it some time, without changing your situation, it will seem to be in relief, and the lights and shades will appear the same as they did before. If you regard it with the same attention still longer, it will again appear to be engraved; and so on alternately.

If you look off the seal for a few moments, when you view it again, instead of seeing it, as at first, engraved, it will appear in relief.

If while you are turned toward the light, you suddenly incline the seal, while you continue to regard it, those parts that seemed to be engraved, will immediately appear in relief: and if, when you are regarding those seeming prominent parts, you turn yourself so that the light may fall on the right hand, you will see the shadows on the same side from whence the light comes, which will appear not a little extraordinary. In like manner the shadows will appear on the left, if the light fall on that side. If instead of a seal you look at a piece of money these alterations will not be visible, in whatever situation you place yourself.

How to place Thirty Soldiers, who have deserted, in a ring, so that any fifteen may be saved, and yet to appear the effect of chance.

This curious problem is proposed in the following manner: Fifteen Christians, and fifteen Turks being in a ship at sea, in a violent tempest, it was deemed necessary to throw half the number of persons overboard, in order to disburden the ship, and save the rest; to effect this, it was agreed to be done by lot, in such a manner, that the persons being placed in a ring, every ninth man should be cast into the sea, till one half of them were thrown overboard. Now the pilot, being a Christian, was desirous of saving those of his own persuasion; how ought he therefore to dispose the crew, so that the lot might always fall upon the Turks?

The question may be resolved by placing the men according to the numbers annexed to the vowels in the words of the following verse.

Po-pu-le-am Jir-gam Ma-ter Re-gi-na fe-re-bat
4 5 2 1 3 1 1 2 2 3 1 2 2 1

From which it appears that you must place four of those you would save first; then five of those you would punish. After this, two of those to be saved, and one to be punished, and so on. When this is done, you must enter the ring, and beginning with the first of the four men you intend to save, count on to nine, and turn this man out to be punished; then count on, in like manner, to the next ninth man, and turn him out to be punished; and so on for the rest.

It is reported that Josephus, the author of the Jewish history, escaped the danger of death by means of this problem; for being governor of Joppa, at the time it was taken by Vespasian, he was obliged to secrete himself with thirty or forty of his soldiers in a cave, where they made a firm resolution to perish by famine rather than fall into hands of the conqueror, but being at length driven to great distress, they would have destroyed each other for sustenance, had not Josephus persuaded them to die by lot, which he so ordered, that all of them were killed except himself and another, whom he might easily destroy or persuade to yield to the Romans.

To make Pictures of Birds with their natural Feathers

First, take a thin board or pannel of deal, or wainscot, well seasoned, that it may not shrink, then smoothly paste on it some white paper, and let it dry; if the wood casts its colour through, paste over a second paper and it will be whiter. When the second paper is dry, get any bird you would represent, and draw it as exact as you can on the papered pannel, of its natural size (middle-sized birds are the best for this work,) then paint what groundwork, or tree, or other thing you design to set your bird on, together with the bill and legs of the bird, with water colours, leaving the bird to be covered with its own

natural feathers. You must prepare the part to be feathered, by laying on pretty thick gum-arabic, dissolved in water, with a large hair-pencil; then lay the pannel flat, and let it dry hard; and when dry, cover it with gum water a second time, and let it dry, and then a third in like manner, till it lies with a good body on the paper the thickness of a shilling. When the pannel is thus prepared, take the feathers off from the bird as you use them, beginning always at the tail and points of the wing, and working upwards to the head, observing to cover that part of your draught with the feather that you take from the same part in your bird, letting them fall one over another in their natural order. You must prepare your feathers by cutting off the downy part that is about their bottoms; and the larger feathers must have the insides of their shafts shaved off with a knife to make them lie flat. The quills of the wings must have their inner webs clipped off, that in laying them the gum may hold them by their shafts. When you begin to lay them, take a pair of steel pliers, to hold the feathers in, and have some gum-water, not too thin, and a large hair pencil ready to moisten the gummed ground; work by little and little as you work it, then lay your feathers on the moistened parts, which must not be waterish, but rather clammy to hold the feathers. You should prepare a parcel of small leaden weights in the form of sugar loaves, which you may cast in sand, by first making holes in its surface with a woman's thimble, or the bowl of a tobacco-pipe, or with a pointed stick. These weights will be necessary to set on the feathers you have newly laid on, to hold them to the gum, till they are dry and fixed; but be very cautious lest the gum come through the feathers, as it will not only smear them, but will stick to the bottoms of the weights, which will make you liable to destrov your work, by pulling off the feathers with the weights. When you have wholly covered the bird with feathers, you must with a little thick gum stick on a piece of paper, cut round, of the bigness, and in the place of the eye, which must be coloured like the eye of the bird. When the whole is dry, dress the feathers round the out-line that may chance to stain a little, and rectify what you may think wants mending in any other part.

Then lay a sheet of clean paper over the whole, and on that a heavy book or stone, or any thing that will press it close, and it will look very handsome, and may be preserved for years by being framed and glazed

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How to make a violent Artificial Tempest of Rain and Hail, for Private Theatrical Performances.

MAKE a hollow cylinder of wood, very thin at the sides, about eight or ten inches long, and two or three feet in diameter. Divide its inside into five equal partitions, by means of boards of about six inches wide, and let there be a space between them, and the wooden circle, of about one sixth of an inch: observing that the boards are to be placed obliquely to each other.

This being done, put into the cylinder four or five pounds of leaden shot, of a size that will easily pass through the opening left for this purpose; then turn the cylinder on its axis, and the sound of the machine, when in motion, will represent that of rain, which will increase with the velocity of the motion; and if a larger sort of shot be used, it will produce the sound of hail.

Curious Experiment to discover Frauds committed by dishonest workmen, in Gold and Silver.

THIS experiment is fully illustrated in the following story of the famous Archimedes:

This justly celebrated man was related to Hiero, king of Syracuse, who had employed some workmen to make for him a golden crown of great value, as an offering to the gods, and weighed out the gold to the artificer. After some time the crown was brought home, of the full weight, but it was afterwards discovered, or suspected, that a part of the gold had been stolen, and the like weight of silver substituted in its stead. Hiero, being angry at this imposition, desired Archimedes to take into consideration, how such a fraud might be certainly discovered. While engaged in the solution of this difficulty, he happened to go into the bath, where observing that a quantity of water

overflowed, equal to the bulk of his body, it presently occurred to him, that Hiero's question might be answered by a like method. Upon which he leaped out of the bath, and ran home naked, crying, "I have found it out! I have found it out!" He then made two masses, each of the same weight as the crown, one of gold, and the other of silver; this being done, he filled a vessel to the brim with water, and put the silver mass into it, upon which a quantity of water overflowed equal to the bulk of the mass; then taking the mass of silver out, he filled up the vessel again, measuring the water exactly, which he put in; this shewed him what measure of water answered to a certain quantity of silver. Then he tried the gold in like manner, and found that it caused a less quantity of water to overflow, the gold being less in bulk than the silver though of the same weight. He then filled the vessel a third time, and putting in the crown itself, he found that it caused more water to overflow than the golden mass of the same weight, but less than the silver one; so that finding its bulk between the two masses of gold and silver, and that in certain known proportions, he was able to compute the real quantities of gold and silver in the crown, and so manifestly discovered the fraud.

Example, to shew how the fraud of robbing Hiero's Crown was detected, by a simple Arithmetical process.

Suppose each of the three masses weighed sixty-four ounces, and that immersing them separately in the same vessel of water, there were displaced five ounces of water by the golden ball, nine ounces by the silver, and six ounces by the compound, or the crown itself, then the respective bulks being as the quantities of water displaced, will be as 5, 9, and 6; and we say,

$$9 - 6 = 3$$
$$6 - 5 = 1$$
$$4$$

4 : 64 :: 3 : 48
4 : 64 :: 1 : 16

And under such circumstances, the crown consisted of forty-eight ounces of gold, and sixteen of silver.

How to discover whether a piece of Money be good or bad.

TAKE another piece of the same metal, of equal weight with the former, and tie both of them with a piece of thread, or a horse hair, to scales of an exact balance, so that the two pieces may fall into a vessel of water. Then, if they be of equal goodness, they will be perfectly in equilibrio in the water, as well as in the air; but if the piece in question be lighter in the water than the other, it is a certain proof that it has been mixed with a baser metal of less specific gravity; and if the piece to be tried is silver, its weighing heavier than the other in water, is also a proof of its having been mixed with a metal of greater specific gravity, such, for instance, as lead.

The Nocturnal Reveilleur.

AGAINST the wall of a room, near the ceiling, fix a wheel of twelve or eighteen inches diameter, on the rim of which place a number of bells in tune, and if you please, of different sizes. To the axis of this wheel, there should be fixed a fly to regulate its motion, and round the circumference there must be wound a rope, to the end of which is hung a weight.

Near to the wheel let a stand be fixed, on which is an upright piece that holds a balance or moveable lever, on one end of which rests the weight just mentioned, and to the other end must hang an inverted hollow cone, or funnel, the aperture of which is very small. This cone must be graduated on the inside, that the sand put in may answer to the number of hours it is to run. Against the upright piece, on the side next the cone, there must be fixed a check, to prevent it from descending. This stand, together with the wheel, may be enclosed in a case, and so contrived as to be moved from one room to another, with very little trouble.

It is evident from the construction of this machine, that when a certain quantity of the sand is run out, the weight will descend, and put the wheel in motion, which motion will continue till the weight comes to the ground. If the wheel be required to continue longer in motion, two or more pullies may be added, over which the rope may run.

The size of the bells should be adapted to the somniferous disposition of the party they are intended to rouse; or if you please, a drum or tabor may be added, the stick to which may be fixed in the side of the room, by a swivel that goes through the middle of it; and one end of it being lifted up by the teeth placed in the circumference of the wheel, the other end will alternately strike the drum.

To make artificial Coral Branches for the embellishment of Grottos, and the method of building a Grotto at a very little expense.

Take clear rosin, dissolve it in a brass pan; to one ounce thereof add two drachms of the finest vermilion; and when you have stirred them all together, and have chose your twigs and branches, peeled and dried them, take a pencil and paint these twigs all over, whilst the composition is warm, and shape them in imitation of natural coral of black thorn; when done, hold it over a gentle coal fire, turn the branches about with your hand, and it will make it all over smooth and even, as if polished. In the same manner you may, with white lead prepare white, and with lamp black, black coral.

A beautiful grotto may be built at a very little expense, with glass cinders, which may be easily had, pebbles, or pieces of large flint, and embellish it with such counterfeit coral, amber, pieces of looking glass, oyster, muscle, and snail shells, moss, pieces of chalk, ore, &c. The cement to bind them together is as follows:—take two parts of white rosin, melt it clear, add to it four parts of bees' wax, when mixed together add stone flour of the stone you design to cement, two or three parts, or so much as will give the cement the colour of the stone; to this, add one part of the flour of sulphur; first incorporate altogether

over a gentle fire, and afterwards knead it with your hands in warm water, with this cement the stones, after they are well directed, and have been warmed before the fire, in order to receive the cement better.

To make a Light burn under Water, in order to decoy Fish together about it, for the net.

TAKE a Florence flask, or a similar vessel, made at the glass-house, and let there be a hole made at the bottom, to fix a candle in the inside of the bottle, with screwed sockets, to which a weight is to be fixed sufficient to draw the body of the glass under water. The neck of the bottle you must leave open, about which is to be fixed a round board; at the inside of the edges place several pieces of looking-glass; the light of the candle will multiply, in rays, according to the number of the pieces, and the fish will be thereby decoyed, and assemble in great numbers about it, so that flinging your net, you will catch them up with ease.

To make a Camera Obscura.

CAUSE a box to be made of wood, square at bottom, running up like a truncated pyramid, on the top of which place another square box, so as to take it off or on at pleasure. In this small box, put a looking-glass, in an oblique position, higher or lower, according as the object requires. The front and the bottom of this box is to be open, for the first to receive the objects on the looking-glass, and the other to fling the radius through the glass, which is fixed in a tube to the upper part or covering of the lower box; this tube must be about four inches long; at the bottom of this box you must put a white paper, on which, by looking through the opening, may be seen the objects without, represented in their natural colours on the paper.

To counterfeit all sorts of Green Leaves on Paper.

TAKE green leaves of trees, shrubs, plants, and flowers of a moderate size: bruise or flatten the ribs of the back part with a knife; this done, have ready a dabber made of a piece of glove leather, the bigness of the palm of your hand or larger, filled with cotton or wool, and tied to the end of a piece of stick like a printer's ball; then on a plate or Dutch tile, mix some lamp-black, with a little linseed oil. When thus you have every thing in readiness, lay your green leaf on a flat board, the smooth side downwards; dip your ball in the black colour, work and spread it about on the clear part of your plate or tile, or on a piece of board; then black over the back part of your leaf, by dabbing it with your ball. Having ready your paper, which must be a little moistened, lay that side of the leaf which is furnished with colour on the paper, and putting another thin paper over it, press it gently down with the palm of your hand; take it off and you will have a fair impression of the leaf to the finest vein. This, when thoroughly dry, you may colour either with sap-green or verdigris, according to the colour of the leaf you have made an impression of. No miniature painter will exceed it by copying it with all his art. Some virtuosi have made a rare collection by this method, and composed a useful herbal, by only drawing or painting the stalk, and joining the impressions of the leaf to it.

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