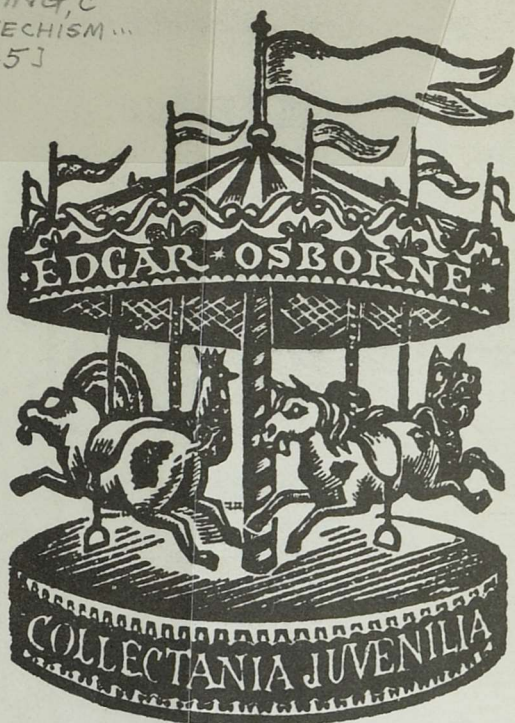


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1825.

CATECHISM
OF
General Knowledge,
being an Easy Introduction to the
Arts and Sciences,
By
C. IRVING LL.D. & F.R.S.



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A
CATECHISM
OF *C. More*
General Knowledge;

CONTAINING
MUCH USEFUL INFORMATION
IN THE
ARTS, SCIENCES,
AND
LITERATURE,

NECESSARY TO BE KNOWN AT AN EARLY AGE.

FOR THE USE OF SCHOOLS.

BY C. IRVING, LL.D. F.A.S.

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LONDON:

PUBLISHED BY LONGMAN, STREET, NEW YORK.
AND BY THE AUTHOR, 10, NASSAU STREET, NEW YORK.
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A

CATECHISM

OF

GENERAL KNOWLEDGE.

CHAP. I.

Of Man.

Q. WHICH is the noblest object in creation?

A. The noblest work of God on earth is Man, who is exalted above the rest of the creation by the superior majesty of his form, but much more by the powers of reason, and the immortality of his soul.

Q. How was man created?

A. We learn by the Holy Scriptures, that God formed man out of the dust of the earth, and breathed into the frail and perishable body a spirit or soul, proper to inform and organize it, and by its union to form a reasonable animal.

T. Describe the structure of the human body.

P. The different parts of the body are admirably adapted to perform the functions for which they were wisely intended: the head is the most beautiful part, and contains the brain, the source

A

of all our thoughts and sensations; the lungs are the organ of breathing; and the heart is more immediately the seat of life, receiving the blood which circulates over all the body by means of veins and arteries.

Q. What are the functions of the other parts of the body?

A. The stomach, shaped like a bag, is the grand receptacle for food, where it is retained until changed by digestion; the muscles, constituting the flesh, are the instruments of motion; the bones serve for the attachment of the other parts; and the feet support the whole, with the assistance of the toes, which serve to fix the feet more firmly upon the ground.

Q. Of what does the intellectual part of man consist?

A. Man is endowed with an immortal soul, the powers of which are capable of thinking, feeling, willing, and remembering; his mind is also adapted to live in a state of intercourse with his fellow-creatures, and to the fulfilling of the great object of his creation.

CHAP. II.

Religion.

Q. FOR what end was man created?

A. The end of our creation was, that we might serve and glorify God in this life, and be happy with him for ever in a life to come.

Q. By what means are we to obtain this eternal happiness?

A. This reward is promised to those who believe in God, and keep his commandments.

Q. What are we to believe of God?

A. By the information of the Holy Scriptures, and the inferences of our reason, we learn that there is but **ONE GOD**, the Creator, and sovereign Lord of all things, all-powerful, without beginning and without end, present every-where, and to whom all our thoughts and actions are known.

Q. What are the precepts which he has commanded us to obey?

A. The commandments of God enjoin us to love God above all things, and our neighbour as ourselves; to honour our parents and superiors; and not to do to others that which we would not they should do to us.

Q. What are the virtues inculcated by these doctrines?

A. Religion teaches us *sincerity*, to act without disguise or falsehood; *charity*, to relieve the wants of others; *temperance*, to moderate our desires; *justice*, to give every man his due; *prudence*, to act cautiously; and *fortitude*, to bear with adversities.

CHAP. III.

DOMESTIC ARTS.

Bread.—Brewing.—Cheese.

Q. OF what is Bread made?

A. Bread, called the staff of life, from its being used in some way or other by every nation, is generally composed of wheaten flour; but sometimes of the meal of barley, oats, or rye.

Q. What is the process in procuring flour to make bread?

A. Small seeds, called wheat, are sown in the ground from September to March, which grow, and ripen in the August and September following, when the produce is reaped, housed, and threshed: it is converted into flour by being ground and sifted at the mill; and the flour mixed with water and yeast, and baked in an oven becomes bread.

Q. What is the process in brewing?

A. A grain called barley, is made into *malt* by being heated to a state of germination, and then broken in a mill; hot water is poured on a quantity of malt in a large tub and well mixed, the liquor is then drawn off and boiled with hops, and after being made to ferment by means of yeast, is tunned up in vessels for use.

Q. How are cider and perry made?

A. The pleasant liquor called cider, is prepared in a simple manner from apples, which should be gathered ripe and dry; the fruit is ground in a mill, and the juice squeezed out by a press; after remaining in hogsheads to work or ferment, it is stopped close, and then drawn out when clear. Perry is made from pears, in the same manner.

Q. How is cheese made?

A. Cheese is made from curdled milk freed from the whey, and afterwards pressed, shaped, and dried for use: it differs in quality, as it is made from new or skimmed milk; and would be white if it were not coloured with a red dye: the most esteemed cheese is that made at Stilton, and in the counties of Cheshire, Gloucester, and Somerset.

CHAP. IV.

ARTICLES OF FOOD, &c.

*Sugar.—Tea.—Coffee.—Chocolate.—Salt.—
Coal.—Soap.—Candles.—Starch.—
Indigo.—Spices.*

Q. How is Sugar obtained?

A. Sugar is a sweet juice extracted from large canes or reeds growing in the East and West Indies: when ripe, the canes are cut and carried to the mill, where they are pressed and broken, and the juice boiled several times, till it becomes what is called raw or moist sugar.

Q. What is loaf-sugar?

A. Loaf-sugar is the raw sugar refined by boiling it with bullock's blood and lime-water; sugar-candy is clarified sugar crystalized upon threads; barley-sugar is melted sugar formed into twisted sticks, and coloured with saffron.

Q. What is tea?

A. Tea, the infusion of which is so generally used as drink, is the leaf of a shrub growing in China and Japan: the leaves are gathered while young, and passed over the vapour of boiling water to moisten them; they are then laid on iron plates, which are heated; and, in drying on these, the leaves curl up in the manner they are brought to us.

Q. Whence is coffee obtained?

A. Coffee is a seed or berry chiefly brought from Arabia, Turkey, and the West Indies: it grows on a kind of evergreen jessamine, and is prepared by roasting it till it has acquired a bright

brown colour, then grinding it in a handmill for use.

Q. What is chocolate?

A. Chocolate is a kind of cake prepared from a nut about the size of an almond, called the cacao or chocolate nut: with the cake is made the drink likewise called chocolate, which is not only a most nourishing food, but also being drunk warm, an excellent medicine for keeping up the warmth of the stomach, and assisting digestion.

Q. How is *salt* obtained?

A. Salt, which is so useful in seasoning and giving a relish to food that would otherwise be insipid, is either dug out of the earth, and called *rock-salt*; or drawn from *brine springs*; or made by exposing *sea-water* to evaporate by the heat of the sun.

Q. How and where is *coal* found?

A. Coal, an invaluable mineral, used as fuel, is found in beds or strata below the surface of the earth, and is sometimes dug out of mines worked to the depth of 900 feet: coals are principally obtained from the neighbourhood of Newcastle-upon-Tyne, Sunderland, and Whitehaven, but are also found in many other parts of Great Britain.

Q. What is *soap*?

A. Soap is a kind of paste usually hard, but sometimes soft and liquid, much used for cleaning linen and other purposes: it is composed of lie mixed with tallow or oil, boiled together.

Q. How are *candles* made?

A. There are two sorts of tallow candles, *dipped* and *moulded*: the wicks are made of spun cotton, and, for dipped candles, are put on sticks and dipped into melted tallow till they become of a proper size; mould candles are made in separate

moulds, which having the wick fixed in the middle, are filled with the tallow.

Q. What is *starch*?

A. Starch is a sediment deposited at the bottom of vessels in which bruised wheat has been steeped in water; after separating the bran from it, by passing it through a sieve, it is dried in cakes, which are broken into small pieces and sold.

Q. What is *indigo*?

A. Indigo is a drug of a deep blue colour, extracted from the leaves of a plant growing in the West Indies: it is of the greatest use to dyers and painters; and is also used by laundresses, to give a bluish cast to their linen.

Q. Whence are *spices* chiefly procured?

A. It is from the East Indies that we are principally supplied with spices; such as cloves, nutmeg, cinnamon, pepper, and ginger.

T. Explain the nature of these different spices.

P. The clove is an aromatic fruit; nutmeg is the kernel of a fruit; cinnamon is the bark of a kind of laurel; pepper is the berry of a creeping plant; and ginger is the aromatic root of a kind of rush.

CHAP. V.

MANUFACTURES.

*Woollen.—Linen.—Cotton.—Silk.—Pins.—
Needles.—Paper.—Parchment.—Leather.
—Hats.—Glass.—Porcelain.*

Q. WHAT is *wool*?

A. Wool is the hairy covering of sheep, which

after being shorn from their back, is dressed, combed, and spun into worsted, and then woven into various kinds of cloths, stuff, &c. for clothing and furniture.

T. Mention some of the articles into which wool is wrought.

P. The woollen manufacture includes broad-cloths, kerseys, baize, serges, flannels, carpets, stuffs, frieze, stockings, caps, rugs, &c.

Q. Of what is *linen* made?

A. Linen is made of flax, the produce of a plant cultivated in several parts of Great Britain: the bark of the plant consists of fibres or threads, which, after being dressed and worked in due manner, are spun into thread, and woven into sheets, table-cloths, and numerous other indispensable articles.

Q. What is *cotton*?

A. The cotton from which so many useful and ornamental articles are made, is a soft downy substance, found in a state nearly fit for the manufacture, in the seed-pods of a small tree growing in the East Indies and America.

Q. Where are the chief manufactories of this material?

A. The chief manufactories of cotton are about Manchester, Glasgow, and Paisley, where they produce muslins of the finest texture, calico, corduroy, fustian, quilting, sheeting, and numberless other articles which are exported to every part of the world.

Q. What is *silk*?

A. Silk is a soft, bright, and delicate thread, derived from the web of a crawling insect or caterpillar, called the silk-worm.

Q. In what manner is it produced?

A. The eggs laid by a moth in the preceding year, are hatched by the heat of the sun, and the young worms are fed with the tenderest leaves of the mulberry tree: after the worm attains its full growth, it winds itself up in a silken bag, about the size of a pigeon's egg, and is converted into a lifeless chrysalis: in a few days it awakens to become a delicate moth, which eats its way out of the silk, lays its eggs, and dies.

Q. How is the silken thread obtained?

A. Before the moths eat their way out, a number of the cones are thrown into a copper of warm water, and the ends of 10 or 12 are spun into a thread: after some slight preparation, the thread is converted by the weaver into a variety of elegant and useful articles; such as satin, velvet, taffety, gauze, brocade, &c.

Q. Of what are *pins* made?

A. This useful little article is made of brass wire in the following manner: one person cuts the wire, another points it, three or four prepare the head, and others put it on; it is then tinned or whitened in a copper, and put on paper for sale.

Q. How are *needles* made?

A. Needles are made of steel, rounded by passing through a hole, larger or smaller, according to the degree of fineness intended: the steel being cut to the proper length, one end is flattened for the eye to be punched out, the other pointed with a file; they are then hardened by being heated red hot and thrown into cold water, and are finally polished for use.

Q. Of what substance, and how is writing and printing *paper* made?

A. Paper is chiefly manufactured of linen rags, which, after being sorted and cleaned, are reduced to a soft pulp in mills by cylinders, with sharp blades of steel; a frame is then dipped in the pulp, which draws up as much as will make a sheet.

Q. How is the paper prepared for use?

A. The sheets when taken from the frame, are placed one above another with layers of felt or woollen cloth between each of them, to absorb the moisture: they are then pressed, laid on cords to dry, and dipped in size; after which, they are pressed, selected, folded, and formed into quires of 24 sheets.

Q. What is *parchment*?

A. Parchment is the skin of sheep or goats, prepared for writing and covering books: the skin stripped of its wool, is stretched on a frame, and pared with a sharp instrument till it becomes of a proper thinness: *vellum* is a finer kind of parchment, made of the skins of sucking calves.

Q. How is *leather* prepared?

A. Leather for shoes and gloves is prepared from the hides of oxen, cows, horses, dogs, &c. by first taking off the hair and grease, and then steeping it many weeks in tan-pits containing a strong infusion of oak bark; the currier afterwards shaves and colours it for use.

Q. Of what materials are *hats* made?

A. The usual materials of which hats are made are beaver's fur mixed with wool and rabbit's fur: the materials are gummed and worked into a sort of cap, which being put upon a block of the intended size, the hat is shaped, dyed, stiffened, and ironed, and is then lined and trimmed for sale.

Q. What is *glass*?

A. Glass is a solid, brittle, and highly transparent substance, produced by melting together sand, flint, and alkaline salts in a furnace; it is then blown into bottles, &c. by means of a long hollow tube; or fashioned into other designs in moulds called stamp-irons.

T. Describe the manufacture of *porcelain*.

P. Porcelain, or *China-ware*, is made of burnt flint mixed with clay of different degrees of fineness, and afterwards baked, painted, and glazed: teacups, basins, jugs, &c. are made on a circular wooden wheel; but plates and dishes are made from moulds.

CHAP. VI.

Commerce.

Q. WHAT is Commerce?

A. Commerce is the exchange of the commodities of one nation for those of another, for the mutual advantage of both. Great Britain is the most commercial nation in the world; and her ships are laden with the produce of every climate, administering to our wants, our comforts, and our luxuries.

T. Mention the principal articles of commerce with the north of Europe.

P. From Russia, Norway, Sweden, and Germany, we procure hemp, flax, timber, pitch, tallow, hides, and rich furs; for which we give in exchange, cloths, hardware, tin, cotton, sugar, rum, and tobacco.

Q. What is the trade with the south of Europe?

A. Spain, Portugal, France, Italy, and Turkey, supply us with wine, oil, brandy, fruits, silk, drugs, sulphur, and gums; and receive in exchange the manufactured goods of Great Britain, tea, coffee, sugar, cotton, spice, rice, tin, lead, &c.

Q. What are the productions of India, Africa, and America?

A. India yields spice, pepper, tea, rice, and silks; Africa produces gold-dust, ivory, drugs, and gums; North America, timber, corn, cotton, tobacco, pitch, and tar; the West Indies and South America export rum, sugar, gold, silver, precious stones, and various medicinal drugs.

CHAP. VII. MECHANICS.

*Pump.—Clockwork.—Steam-engine.—
Diving Bell.—Air Balloon.*

Q. WHAT are Mechanics?

A. Mechanics is a mathematical science, which teaches us the use of simple machines, with which to raise weights, to move heavy bodies, and to overcome resistances that are above our natural strength.

Q. What are the machines used for these purposes?

A. These machines, called mechanical powers, are six; namely, the *lever*, the *wheel and axle*, the *pulley*, the *inclined plane*, the *wedge*, and the *screw*.

Q. What name is given to the pump, mill, and other useful engines?

A. These are called compound machines, being formed by the combination of several powers, by which means the powers are more easily applied, and many other advantages obtained.

Q. Upon what principle is the common sucking *pump* constructed?

A. A few minutes examination of this truly useful engine will afford a better idea of it than any description: in the upper part is the piston or *bucket*, in which there is a valve opening upwards like a trap-door, to allow the air and water readily to ascend, but to prevent either from descending; at the bottom there is a fixed valve opening also upwards, through which the water is lifted by the downward action of the handle of the pump, and enters through the valve of the bucket in raising up the handle.

Q. What is the construction of a mill?

A. A mill is a machine for grinding corn, and is put in motion either by water, horses, or wind: the corn is admitted between two large flat stones, one of which turning with great velocity crushes the wheat and grinds it to flour, which being separated from the bran or covering of the grain, is fit for making bread.

Q. Upon what principles are *clocks* and *watches* constructed?

A. Clocks and watches are composed of a number of wheels of different sizes and numbers of teeth, so as to indicate hours, minutes, and seconds: clocks are set in motion by weights; and watches by a coiled spring, which in seeking to uncoil itself, sets one wheel in motion, which turns all the rest.

Q. What is the *steam-engine*?

A. The steam-engine, one of the noblest monuments of human ingenuity, is a machine that is sometimes made to perform the labour of 60 or 80 horses, and to work vessels on the sea, or on rivers against wind and tide: this is done by means of the steam of boiling water, applied above and below a piston-rod, which it forces up and down.

Q. What is a *diving bell*?

A. The diving bell is a machine by means of which one or more men may stay under water a considerable time: it is in the form of a bell, shut at top and open at bottom; and so heavy, that it sinks in the water full of air: the diver is seated within it, and receives light through a strong but clear glass fixed in the top.

Q. Upon what principle does the *air-balloon* ascend?

A. The air-balloon is a large silken bag filled with the air or gas produced by the mixture of iron-filings, sulphuric acid, and water, which being 12 times lighter than the common air, will rise in it, and support great weights; so that persons have ascended to a vast height above the clouds, and travelled at the rate of 50 or 60 miles an hour.

CHAP. VIII.

Mathematics.

Q. WHAT are Mathematics?

A. Mathematics are the sciences which treat of whatever relates to number, figure, motion, or proportion: they are the most perfect of all

others; and the study of them gives exercise to invention, enlarges the understanding, and is the best introduction to every other species of knowledge.

Q. What are the sciences included under this head?

A. Mathematics, taken in their most extensive sense, include Geometry, Astronomy, Navigation, Arithmetic, Algebra, Mechanics, Architecture, Optics, and Geography.

Q. Of what does *geometry* treat?

A. Geometry is a very useful and beautiful science, which teaches us to determine the relation and magnitude of lines, surfaces, and solids.

Q. What do you mean by surfaces and solids?

A. Those things which have length and breadth only, are termed *superficies* or surfaces; such as the admeasurement of a board, table, field, &c. and what has length, breadth, and thickness, is termed a *solid*: whether it be a log of wood, a pyramid, or a globe, geometry can accurately determine its contents of inches, yards, or miles.

Q. What else does geometry include?

A. A knowledge of the proportions of *angles*, or corners formed by the meeting of two lines, *cones*, *circles*; and, in short, figures of every size or shape, come under the subject of geometry.

Q. To whom is the study of this science particularly useful?

A. Geometry is highly necessary to most mechanics; especially carpenters, joiners, masons, builders, mathematical instrument makers, &c. who are all indebted to it for the perfection and value of their workmanship.

CHAP. IX.

Arithmetic.—Algebra.

Q. WHAT is Arithmetic?

A. Arithmetic is the science of reckoning by figures; and consists of four fundamental rules, viz. Addition, Subtraction, Multiplication, and Division, by which all others are performed.

Q. What is Addition?

A. Addition is the adding together two or more numbers, so as to find their amount or total sum; thus, 3 added to 4, make 7; 12 added to 8, make 20.*

Q. What is Subtraction?

A. Subtraction is the taking a less number from a greater, in order to find the difference: thus, 7 from 12 leaves 5; 12 from 20 leaves 8.†

Q. What is the use of Multiplication?

A. Multiplication teaches to find how much any number amounts to, by being repeated any given number of times; thus, 5 repeated 4 times are 20; 8 times 5 are 40.‡

Q. What is Division?

A. Division is a rule by which we divide any sum into a given number of equal parts, or find

* *Application.*—His Majesty George IV. was born in the year 1762; when was he aged 58?

How many days are there in the 12 calendar months?

† How much is William older than John, the former being born in 1804, the latter in 1822?

The revolution in England took place in 1688; how many years is it since to the present time?

‡ What is the number of inhabitants in a town containing 385 houses, and each house 5 persons?

What are 579 bullocks worth, at 6*l.* each?

how often one number is contained in another: thus, 8 divided by 2, gives 4; 12 divided by 4, gives 3.*

Q. What is *Algebra*?

A. Algebra, or abstract arithmetic, is a short method of calculating all kinds of quantities, by using letters of the alphabet instead of known numbers, and operating them by the signs $+$ plus or more; $-$ minus or less; \times expressing multiplication; \div division; and $=$ equal to.

Q. How is the operation performed?

A. Any letters of the alphabet, usually the first, *a, b, c, d*, &c. are adopted at pleasure, in place of any given numbers, and are operated with the above signs, till by reasoning we have acquired such a disposition of the said letters as displays the result.

Q. Is this science of much utility?

A. Algebra, though little studied, is of great utility, many questions being solved by it, which are beyond the reach of common arithmetic; and it is so simple, that a child who is acquainted with the four first rules of arithmetic, may understand it.

CHAP. X.

Military and Naval Affairs.—Magnet.—Gunpowder.

Q. Who are the Military?

A. The military state includes the soldiery, or persons appointed and paid for the defence of

* Five lads have to divide 70 apples among themselves; how many is that to each?

the kingdom: in time of war, England and its colonies have about 300,000 fighting men, called the *standing army*.

T. Describe the organization of an army.

P. An army is commanded by a *general* or commander-in-chief, who has under him other generals: it is divided into *regiments* of 1,000 men, commanded by *colonels* and *majors*; and each regiment consists of ten *companies*, under *captains* and *lieutenants*, assisted by *sergeants* and *corporals*.

Q. How many ships are there in the British navy?

A. The British navy consists of about 700 ships; of which some are called *ships of the line*, carrying from 64 to 120 guns each; others *frigates*, carrying from 28 to 50 guns; and others brigs, sloops, cutters, bomb-vessels, &c. having less than 28 guns.

Q. How is the navy commanded?

A. A number of ships of war, called a *fleet*, is commanded by an *admiral*, assisted by vice and rear admirals; each ship is under the orders of a *captain*, who has under him several *lieutenants* and *midshipmen*.

Q. Is not a ship a wonderful instance of human ingenuity?

A. There are few productions of art which excite more wonder and admiration than a majestic first-rate ship of war, built by the combination of human industry, large enough to contain 1,000 men, with their provisions and other necessities for many months, besides 100 pieces of heavy ordnance, and bearing these in safety through a tempestuous ocean, to the most distant parts of the world.

Q. What name is given to the art of conducting ships on the sea?

A. The art of guiding ships at sea is called *navigation*; and is now brought to such a degree of nicety by the compass and other means, that a mariner may sail in a ship for weeks together without seeing any land, and yet may know at any time in what part of the sea she is, within half a mile.

Q. What is the compass?

A. The mariner's compass consists of a magnetic needle or loadstone, which having the singular property of always pointing to the north, enables the mariner to ascertain the course he is sailing: the magnet is fixed on a card, which is enclosed in a frame, and divided into parts, called points; viz. north, south, east, and west, each subdivided into eight points.

Q. What are the implements used in war?

A. The most destructive military engines are the cannon or large gun, carrying iron balls from 3 to 48 pounds in weight; the *musket*, carrying a small leaden ball; and the *mortar*, which throws a *bomb* or large iron shell filled with gunpowder to make it burst.

Q. From what is gunpowder made?

A. Gunpowder, the powerful engine of destruction, which produces the effect and action of guns, is a composition of nitre, sulphur, and charcoal mixed together, and formed into small grains by passing it through a sieve.

CHAP. XI.

GEOLOGY.

*The Earth.—Origin of Springs and Rivers.
—Volcanoes.—Earthquakes.*

Q. OF what does the science of Geology treat?

A. Geology embraces the consideration of the structure of the earth which we inhabit, and of the materials of which it is composed.

Q. Of what is the bulk of the earth composed?

A. The earth, as far as it has been possible to ascertain, is composed of solid masses of rocks, placed over each other, and intersected by veins of metals; over which on the surface, are the alluvial formations, consisting of coal, sand, gravel, clay, and loam.

Q. What is the origin of springs and rivers?

A. The tops of mountains in general, abound with cavities and subterraneous caverns, and their pointed summits piercing the clouds, precipitate the water, which penetrating easily through beds of sand and earth, forms a basin or cavern, and issues out at the side of the mountain; many of these springs uniting, form rivulets, and these again meeting in the plain form rivers.

Q. What are *volcanoes*?

A. Volcanoes are mountains in whose cavities internal fires are situated, that burn with more or less force at different times: the appearance of a volcano in an eruption, is represented as appalling, grand, and altogether wonderful from the vast columns of smoke, ignited matter, and stones, hurled into the air with inconceivable violence and rapidity, exclusive of the torrents of liquid

fiery substances, which roll down its sides in solemn and destructive majesty.

Q. By what are earthquakes supposed to be occasioned?

A. The supposed cause of earthquakes, is steam engendered in the bowels of the earth: their operation is truly terrific; the earth shakes violently, accompanied with dreadful noises under ground; often destroying towns and cities, or making horrible chasms, which swallow up every object within their boundaries.

CHAP. XII.

METEOROLOGY.

Air.—Wind.—Clouds.—Rain.—Snow.—

Hail.—Rainbow.—Thunder.—

Lightning.—Meteors.

Q. WHAT is Meteorology?

A. Meteorology is the study of the variable phenomena of the atmosphere; such as mists, clouds, rain, hail, snow, &c.

Q. How do you explain the nature of *air*?

A. The air or the atmosphere, is that thin, light, invisible fluid in which we breathe and live: without it, vegetation would cease, there would be neither rain nor refreshing dews, we should have no sound, no smell, no light, nor could we ourselves exist.

T. Explain the nature and use of *wind*.

P. The wind is nothing else than the air put violently in motion: it is extremely necessary for the sailing of ships, drying up the wet, and

moderating heat; but, above all, for purifying the atmosphere, which would otherwise soon become unfit for respiration.

Q. How are the *clouds* formed?

A. Great quantities of vapour, or small particles of water, are drawn up by the heat of the sun from the ocean and moist parts of the earth, which collecting in the air form clouds.

Q. How is water able to float in the air?

A. Water rarefied by heat, becomes much lighter than the air, and will therefore float in it; as may be seen in a kettle of water boiling over a fire, which would all evaporate or fly off in small particles called steam.

Q. What is the natural cause of *rain*?

A. The particles of vapour forming the clouds, being suddenly disturbed, unite together, and become drops of water too heavy to continue suspended in the air, and which therefore fall in the shape of rain.

Q. How are *snow* and *hail* formed?

A. Snow is vapour frozen while in the cloud, and falling with a slow and gentle motion in little white flakes; hail is the vapour formed into drops, and frozen while falling.

Q. What occasions the *rainbow*?

A. The beautiful appearance called the rainbow, is formed by the reflection of the rays of the sun entering the drops of falling rain: it is always seen in that part of the heavens opposite the sun.

Q. What is the cause of *thunder* and *lightning*?

A. Lightning is electric fire darted from the clouds by their meeting with one another; and thunder is the report, and the echoes of the report

between the clouds and the earth; it succeeds the lightning in the same manner as we hear the report of a cannon sometime after we have observed the flash.

Q. What are *meteors*?

A. Meteors are moveable fiery bodies that appear in the air; such as falling stars, and the *ignis fatuus*, usually called *Will with a wisp*, or *Jack-o-lantern*, chiefly seen in the night in marshy meadows, about six feet from the ground.

Q. How are they supposed to be occasioned?

A. Meteors are ascribed to the effect of electric fire; the *ignis fatuus* consists of inflammable air arising from putrid vegetables, &c.

CHAP. XIII. ASTRONOMY.

Comets.—Milky-way.—Eclipses.—Tides.

Q. WHAT is Astronomy?

A. Astronomy is the science which instructs us in the knowledge of the heavenly bodies; as the sun, moon, planets, and fixed stars.

Q. What is the *sun*?

A. The sun is an immense globe, the source of light and heat, to which we owe the change of the seasons, the growth of vegetables, and the production of every thing desirable for man.

Q. What are the *planets*?

A. By the planets are meant stars that revolve round the sun, and receive light from him, being themselves dark opaque bodies: the planets, their moons, and the comets, form what is called the *solar system*.

T. Name the planets composing the solar system.

P. There are seven planets, whose names are Mercury, Venus, the Earth, Mars, Jupiter, Saturn, and the Georgium Sidus; besides four lately discovered, called asteroids, or minor planets; namely, Vesta, Juno, Ceres, and Pallas.

Q. Is *the earth* then which we inhabit a planet?

A. The earth in which we live is a planet of nearly a round figure, moving about the sun in the space of a year, and turning round on its own axis every 24 hours.

Q. What are the effects produced by these motions?

A. The annual motion of the earth round the sun, is the cause of the different seasons of spring, summer, autumn, and winter; and its daily motion produces the succession of day and night.

Q. What is the size of the earth, and how far is it from the sun?

A. The earth is nearly 25,000 miles in circumference, and is distant from the sun 95,000,000 of miles.

Q. What is the *moon*?

A. The moon is a satellite which moves round the earth every month, serving to reflect by night the light of the sun for the use of the inhabitants. Jupiter and other planets have also moons.

Q. Does the moon shine by her own light?

A. The moon is a dark body, having no light of herself, but receiving her light, like our earth, from the sun: being the nearest to us of the heavenly bodies, she appears the largest, though in reality the smallest in the solar system.

Q. What are *comets*?

A. Comets are a kind of planets belonging to our system, and revolving round the sun at very distant periods: they generally appear with tails resembling hair thrown in an opposite direction to the sun; but their real nature and use remain as yet unknown.

Q. What are the numerous *stars* seen in a clear evening?

A. These stars do not belong to our solar system, but are supposed to be suns, enlightening other and more distant worlds: they are called *fixed stars*, because they do not change their place in the heavens as the planets do.

Q. How may you distinguish a planet from a fixed star?

A. The fixed stars always twinkle; but the planets shine with a steady light, like the moon.

Q. What do you call that white appearance which seems to encircle the heavens?

A. It is called the galaxy, or *milky-way*, and its luminous appearance is supposed to proceed from a vast number of small stars.

Q. What is the cause of solar *eclipses*?

A. An eclipse of the sun is caused by the moon's passing between us and the sun, and thereby obscuring its light.

Q. What is an eclipse of the moon?

A. An eclipse of the moon is occasioned by the earth being in a direct line between it and the sun, by which means the earth's shadow appears like a dark body passing over the moon.

Q. Is not the periodical motion of the sea, called *tides*, connected with astronomy?

A. The tides, or the flowing and ebbing of the sea every six hours, are occasioned by the at-

traction of the moon and sun upon the waters: they are wisely ordained by Providence to keep the waters in constant motion, which would otherwise become corrupted, and putrefy.

CHAP. XIV.

Natural History.

Q. WHAT is Natural History?

A. Natural History signifies a knowledge and description of the various productions of the earth.

Q. How are the productions of nature divided?

A. Every substance known to man belongs to one of the three grand divisions of nature, called kingdoms; namely, the Animal, the Vegetable, and the Mineral.

Q. By what names are those three divisions distinguished?

A. The study of animals is called *Zoology*; that of vegetables, *Botany*; and the knowledge of mineral bodies, *Mineralogy*.

CHAP. XV.

ANIMATED NATURE.

Coral.—Sponge.

Q. WHAT are the objects in nature distinguished by the name of animals?

A. Animals are all living bodies that enjoy sensation, and have the power of moving from place to place.

Q. Into how many classes are animals divided?

A. Linnæus, a celebrated naturalist, whose

distribution is chiefly followed, divides animals into six classes: 1. *Mammalia*, or those that suckle their young. 2. *Aves*, or birds. 3. *Amphibia*, or amphibious animals. 4. *Pisces*, or fishes. 5. *Insecta*, or insects. 6. *Vermes*, or worms.

Q. Which is the first animal in creation?

A. Man is the noblest of all God's creatures; the faculties of reason and speech mark him out as lord of the creation; and his progressive improvement distinguishes his pre-eminence above all other animals.

Q. For what are birds, amphibious animals, &c. remarkable?

A. Birds are distinguished from quadrupeds, by laying eggs, and by being feathered so as to be adapted for flight; amphibious animals can live either on land or in water; whereas, fishes inhabit the latter element, and die when exposed to the air.

T. Describe the structure of insects.

P. The number and variety of insects, and their diminutive size justly excite wonder and admiration: they have usually six legs, and instead of bones a hard shell; and some of them are so small, that a thousand could dance on the point of a needle, yet each is as perfectly formed as the largest animal.

Q. Is not *coral* the production of insects?

A. Coral, of which necklaces and other elegant ornaments are formed, is the habitation of numberless small insects, which grow in the sea, in such quantities as to create islands: the part used is the stony or inner part of the coral, around which the insects are fixed in a rugged crust.

Q. What is *sponge*?

A. Sponge is a kind of marine animal found adhering to rocks, shells, &c. in the sea: it is of various forms, very flexible, and clothed with a jelly-like flesh, full of holes, which are the mouths of the animal, and serve to suck in and throw out the water.

CHAP. XVI.

Botany.

Q. WHAT is Botany?

A. Botany is that part of natural history which treats of the nature and uses of plants or vegetables.

T. Describe the progress of vegetation.

P. The seed being buried in the earth, in a few days swells by the moisture, and throws out two shoots, one of which strikes downwards and forms the root, and the other forces its way upwards into the air, and grows into a plant.

Q. What are the different parts of a vegetable?

A. Every vegetable is composed of a root, stem, leaves, flowers, fruits, and seeds; all which are supported by the juices derived from the earth, called *sap*, and the air and moisture imbibed from the atmosphere.

Q. Is earth indispensable to the growth of vegetables?

A. It is not; for vegetables will grow in woollen cloth, moss, &c. provided they be supplied with water: and seeds of various plants have been sown in pure river-sand, among metal, and even common leaden shot, with no other nourishment than

distilled water, where they have passed through all the usual gradations of growth to perfect maturity.

Q. How many different kinds of plants are there?

A. There are about 40,000 distinct species of plants; and varieties of the same plant without number.

Q. By what means are we able to acquire any clear knowledge of their natures, differences, and comparative uses?

A. In order to name and distinguish the different kinds of plants, the philosopher Linnæus arranged them into 24 *classes*, subdivided into *orders*, *genera*, and species.

Q. What is the use of this study?

A. There is not a more pleasing or useful study than that of Botany: it affords an innocent and healthy amusement, by attracting us often into the fields, and is also of the utmost consequence, for knowing plants, and applying them to their various domestic and medicinal purposes.

CHAP. XVII.

MINERALOGY.

Diamond.—Precious Stones.—Gold.

Q. WHAT is Mineralogy?

A. Mineralogy is the science which teaches us the properties of the solid and inanimate bodies which compose our earth, and how to distinguish and class them into a proper order.

Q. Into how many classes are minerals divided?

A. Mineral substances are comprehended in four classes; namely, the earthy, the saline, the inflammable, and the metallic.

Q. What are the principal substances called earthy?

A. The substances which compose the first class are chiefly those that form the exterior part of the earth; as, clay, flint, stones, earths, calcareous spar, precious stones, and gems.

Q. Whence are diamonds and other precious stones procured?

A. Diamonds, the most brilliant and valuable of all gems, are found in the beds of streams in the East Indies and South America: rubies are of a sparkling red colour; the emerald is of a beautiful green; the topaz, a brilliant yellow; and the cornelian is a pebble, which when burnt is generally of a blood-red colour.

Q. What are the substances of which the second class is composed?

A. The saline class consists of fossil salts; as, common salt, alum, vitriol, nitre or salt-petre, and borax.

Q. What are the characters of the inflammable class?

A. The inflammable minerals forming the third class, are light, brittle, and capable of taking fire; such are coals, sulphur, jet, mineral, charcoal, and amber.

Q. What are the substances forming the metallic class?

A. Metallic minerals are heavy, capable of being wrought into any shape, and exhibiting a peculiar lustre: the principal metals are platina (the heaviest), gold, silver, mercury, copper, iron, lead, tin, and zinc.

Q. What are the peculiar properties of gold?

A. Gold, the most valuable of all other metals, is found in mines mixed with silver and copper, or in pure grains in the sands of rivers: it is so malleable, that an ounce of it will gild a wire 12,000 miles in length; and it may be beaten so thin, that 30,000 leaves would not be more than the twelfth part of an inch in thickness.

CHAP. XVIII.

Agriculture.

Q. WHAT is Agriculture?

A. Agriculture is the science which teaches the means of making the earth produce, in plenty and perfection, those vegetables which are necessary to the subsistence of man, and of the animals reared by him for food or labour.

Q. What advantages do we derive from it?

A. To agriculture we are indebted for the materials of food, drink, and clothing, which are afterwards made fit for use by the artisan and manufacturer: it is, therefore, with reason, held in the highest estimation, and practised by persons of eminence and talent.

Q. What means are used to render the soil fertile?

A. Fertility of soil is secured by frequent cultivation, manuring with animal dungs, and mixing different soils together: enclosures also greatly improve land by protecting it from inclement winds.

Q. What are the principal objects of cultivation?

A. The most important crops reared in Britain, are wheat, barley, rye, oats, potatoes, turnips, pease, beans, and grass; the farmer has, besides, cows, which yield him butter and cheese; cattle, sheep, hogs, and poultry; also bees for honey, and fish stocked in ponds.

CHAP. XIX.

The Fine Arts.

Q. WHAT do you mean by the Fine Arts?

A. The Fine Arts are those which blending elegant ornament with utility, convey intellectual pleasure to the mind.

Q. What is their number?

A. The arts generally distinguished by the appellation fine, are Poetry, Music, Painting, Sculpture, Engraving, and Architecture.

Q. Is the cultivation of these arts of much importance?

A. A knowledge of the fine arts is not only considered an elegant accomplishment, but is likewise necessary for improving the taste, enlarging the understanding, and facilitating various processes and operations in the arts of life.

CHAP. XX.

Drawing and Painting.

Q. WHAT is Drawing?

A. Drawing is the art of accurately representing the forms of persons and things, by which means they may be preserved long after the originals have perished.

Q. How is this art acquired?

A. A person who has a natural genius for drawing, may soon acquire it by beginning at first with easy figures, by constant practice under the instructions of a master, and by studying perspective, or how to represent every object in its proper bearing.

Q. What are the materials used in drawing?

A. Drawing is practised on paper with black-lead, chalk, crayons, Indian ink, and water-colours; and on boards and canvass with oil-colours, which last is more particularly called painting.

Q. What are the essential parts of painting?

A. In order that a painting be well executed, the objects made choice of must be appropriate, and well arranged; each must have its just proportion of figure, and every part be corresponding; and the colours must be disposed so as to produce the proper effect.

CHAP. XXI.

Sculpture.

Q. WHAT is Sculpture?

A. Sculpture is the art of forming various figures out of marble, stone, and other hard substances: carving is applied to making figures out of wood.

Q. What are the different kinds of sculpture?

A. Sculptured figures receive different appellations, according as they project from the plane they were designed on: in *alto-relievo*, or high relief, the figure projects as in the life; in *basso-relievo*, or low relief, the work is but little raised from

the ground, as in a Waterloo medal, or any piece of coin.

Q. What names are given to the forms of the figures?

A. *Bust* denotes a portrait of a person in relief, showing only the head, shoulders, and breast; a *statue* is a representation of the whole body; and a *group* is an assemblage of two or more figures, so disposed as to have an apparent connexion with each other.

CHAP. XXII.

Engraving.—Coining.—Printing.

Q. WHAT is Engraving?

A. Engraving is a term applied to the art of cutting lines upon a plate of copper, by means of a steel instrument, in so judicious a manner as to produce imitations of paintings and drawings when printed on paper.

Q. May not wood be used for the same purpose as copper?

A. Engraving may also be performed on wood, which is exactly the reverse to engraving on copper, the strokes being sunk or cut into the copper; whereas, in engravings on wood, all the wood is cut away, except the lines to be printed.

Q. What other kinds of engravings are there?

A. Glass is engraved, or etched, by means of acid; precious stones are cut or engraved for seals, &c.; and steel is used in cutting dies for striking coins or medals.

T. Describe the operation of coining money.

P. The pieces of gold, silver, or copper, being

reduced to the size, weight, and thickness of the intended coin, are stamped, or struck in a press with punches or dies of steel, on which are engraved the sovereign's effigies, arms, legend, &c. after which they are again weighed and examined, and become current money.

Q. How is the *printing* of books, &c. performed?

A. The metal types, or letters being distributed each kind by itself in cases, the compositor places the copy of the work before him, and picks up letter by letter, and arranging them in order to form words and sentences, till he has composed a page; and so on for the whole work.

Q. What is the next process?

A. The work is now carried to the printing press, a very complex machine, where the types are covered with ink, and a sheet of paper is laid over them; the press then passes over and presses upon the types, and one side of the sheet of paper is printed at one stroke, into whatever number of pages it may be divided.

Q. Is the art of printing by moveable types of great antiquity?

A. This ingenious and invaluable art, to which we are indebted for the progress of learning and science, and many of the inventions and improvements in the arts, was not discovered till about 400 years ago: it has since been brought to great perfection, and applied to almost all the purposes of civilized life.

CHAP. XXIII.

Architecture.

Q. WHAT is Architecture?

A. Architecture is the art of forming dwellings or erecting buildings of any kind.

Q. In what does the art chiefly consist?

A. The excellence of architecture consists in such a regular disposition of the materials of an edifice, as shall give it strength and convenience, beauty and proportion; for this purpose different modes of building, called orders, have been adopted.

Q. What are the names of the orders?

A. There are five orders of architecture, invented successively by the ancient Greeks and Romans; called the Tuscan, the Doric, the Ionic, the Corinthian, and the Composite; to one of which the principal buildings in Europe are conformed.

T. Describe the characteristics of each order.

P. The Tuscan order is without ornament, massive and simple; the Doric is equally strong, but enlivened with ornaments in the entablature; the Ionic pillar is graceful and majestic, being fluted and adorned with scrolls; the Corinthian, the finest of all the orders, has the capital or top of the pillar adorned with leaves; and the Composite is so called, from its partaking of the two last.

Q. Have not other styles of building been introduced in more modern times?

A. The Saxons had also a simple style of architecture, found in many old buildings in England; but most of our old cathedrals are con-

structed in the beautiful *Gothic* style, distinguished by its lofty spires and pinnacles, large and ramified windows, and by its pillars, carved to imitate several conjoined.

Q. Of what are the houses of England now chiefly built?

A. Houses are now principally constructed with bricks made of clay, sand, and ashes; which are cemented together with mortar, formed by a mixture of lime, sand, and water.

CHAP. XXIV.

Acoustics and Music.

Q. WHAT is meant by Acoustics?

A. Acoustics is the science which instructs us in the nature of sound.

Q. How is sound produced?

A. Sound is produced by a vibrating or shaking motion communicated to the air by the blow or shock of one body against another: the vibrations in the air may be compared to the circles produced by throwing a stone in the water.

Q. What is an *echo*?

A. Echoes are produced by the air which has been set in motion striking against a wall, rock, or other substance; by which it is repelled, and produces a sound similar to the original sound, but which seems to proceed from a body situated behind the place that produces the echo.

Q. What is the principal use to which this science is applied?

A. Acoustics forms the foundation of *music*, which is the art of producing a succession of

sounds agreeable to the ear: it is a delightful study, affording at all times a source of exquisite pleasure, soothing to the mind, and capable of moving all the passions of the human soul.

Q. Is it not, then, deserving of being generally cultivated?

A. As means of agreeable and innocent amusement, music deserves, and generally obtains, a place in polite education; but we should endeavour rather to improve our taste, and meliorate our ear, than attempt any vain proficiency in execution.

CHAP. XXV.

OPTICS.

*The Eye.—Light.—Spectacles.—Microscope.
—Telescope.—Colours.*

Q. WHAT is meant by Optics?

A. Optics is the science of vision, and instructs us in the doctrine of light and colours, and all the phenomena of visible objects.

Q. What is light?

A. Light consists of an inconceivably great number of particles generated by the sun, or flowing from luminous and fiery bodies in all directions.

T. Exemplify the action of light in rendering bodies visible.

P. When a candle is introduced into a dark room, or a ray of sun-shine is admitted through a window-shutter, every thing in a moment becomes visible, by the emission of innumerable rays or particles of light proceeding from the

candle or ray to the objects around us, and from them to the eye, producing therein a figure of the objects, and a corresponding idea of them in the mind.

Q. In what manner do objects become visible to the eye and perceptible to the mind?

A. The rays of light pass through a small hole in the centre of the eye, called the pupil, and are received on the optic nerve, which is spread like a net to receive the impression of the objects before the eye, and communicate their effect to the brain. The same effect may be produced by holding a common spectacle glass at a proper distance from a wall.

T. Mention some of the wonderful properties of light.

P. Light has been ascertained to travel 12,000,000 of miles in a minute; and its particles are so inconceivably small, that a single candle may be seen a mile or two around, in an instant after it is lighted.

Q. What are the modifications of which light admits?

A. When the rays of light strike against a surface, and are driven back from it, they are said to be *reflected*; but when they are turned out of their course, as they pass obliquely out of one transparent body into another, the effect is called *refraction*.

Q. What familiar instances can you produce of reflection?

A. All objects are rendered visible by the light they reflect from their surface; and glass itself is distinguished by the rays it reflects: bodies in general, with polished surfaces, reflect the rays

of light copiously, and are called *mirrors*: these are usually smooth plates of glass, tinned or quick-silvered on the back part, and called looking-glasses.

T. Explain the effects of refraction.

P. When an oar, or other straight piece of wood is partly immersed in water, it no longer appears straight: and if a halfpenny be put into an empty basin, and a person stand at such a distance that the coin may not be visible, while another pours water into the basin, the halfpenny will then be clearly seen: both these appearances are the effect of refraction.

Q. How are these phenomena caused?

A. These singular effects are produced by the bending of the rays of light at the surface of the water, because water resists the motion of light less than air.

Q. To what useful purposes has the principle of refraction been applied?

A. Advantage has been taken of the property of refraction to form *lenses* or glasses, in which all the rays of light that pass through them are collected into one point called the *focus*, instead of going straight forward as in common glass: with such glasses are formed the optical instruments, called microscopes, telescopes, spectacles, camera-obscuras, and several others.

Q. What are the lenses used for *spectacles*?

A. Spectacle glasses are either *concave* or *convex*: the concave, used by shortsighted persons, are thinner in the middle than at the sides; but the convex glasses for aged persons, are, on the contrary, swelled in the middle, being wrought thicker in that part than towards the sides.

Q. How do these glasses enable the persons that use them, to see distinctly?

A. The cause of the decline of sight in old age, is, that the ball of the eye is too *flat*, and therefore requires the help of the *convex* glass to collect the rays into the proper focus: in short-sighted persons the eye is too *round*, and in consequence wants the *concave* glass to diverge or spread the rays, and thereby render vision distinct.

Q. What are *microscopes* and *telescopes*?

A. Microscopes are instruments for magnifying small objects, or enabling us to see such as are not perceptible to the naked eye: Telescopes enable us to view objects at a great distance, by means of glasses placed in a tube.

T. You said that optics also taught the doctrine of colours; explain what colours are.

P. The light of the sun, which to us appears perfectly white, was discovered, by the great philosopher Newton, to consist of no fewer than seven different colours; and that the various colours which adorn the creation, arise from the kinds of rays reflected by each object.

Q. What are the names of these colours?

A. The seven primitive colours are red, orange, yellow, green, blue, purple, and violet; all other tinctures are but modifications of these: white is a compound of all the seven; and black is a complete absorption of all the rays, reflecting no colour.

CHAP. XXVI. CHEMISTRY.

Solids.—Liquids.—Gas.

Q. WHAT is Chemistry?

A. Chemistry is a useful science which teaches us to ascertain the nature and properties of bodies, and the elementary or first principles of which they are composed.

Q. What are the different states of natural bodies?

A. All bodies are either solid, liquid, aeriform, or imponderable.

Q. What is meant by a solid body?

A. Solid bodies are those whose parts are firmly connected together.

Q. What do you mean by liquid substances?

A. Liquid substances or fluids, are those whose parts do not firmly cohere, but readily yield to impression: they are incapable of being compelled into a smaller compass, and when in small masses assume a round form.

Q. What occasions the difference between solid and liquid substances?

A. Liquid substances are merely solids made fluid by means of heat: wax exposed to the fire, and lead melted in the bowl of a tobacco pipe, are familiar instances of this; and it may be seen in water, which, when deprived of heat, congeals and forms ice.

Q. What do you call aeriform substances?

A. All elastic fluids, generally called vapours and gasses, are included under the term aeriform.

Q. How is gas procured for lighting streets?

A. The gas, now extensively used in London and other towns, for lighting the streets, theatres, shops, &c. is procured by heating coals in a furnace, and purifying the vapour by passing it through lime-water: it is then collected in a reservoir, called a gasometer, and from thence conveyed through pipes to the streets and private buildings.

Q. What are the advantages arising from the study of this science?

A. Chemistry discovers to us the causes of numerous phenomena, which without its help would be incomprehensible: it has lately been cultivated with the greatest success by persons of eminent abilities; and, as an amusement tending to develop sublime views of the harmony of the universe, it forms a pursuit highly worthy of a cultivated mind.

CHAP. XXVII. MEDICINE.

Health.—Colds.—Poisons, and their Treatment.

Q. WHAT is Medicine?

A. Medicine is the art of preserving health, and of applying the proper remedies for the cure or alleviation of diseases.

Q. To what causes may diseases be ascribed?

A. Diseases, unless hereditary, may be ascribed to improper diet, breathing impure air, want of cleanliness in our person, depraved habits, or imprudently exposing ourselves to the air after violent exercise.

Q. By what means is health best preserved?

A. Nothing is more conducive to health and long life, than regular moderate exercise, in an uncorrupted atmosphere; frequent washing of the different parts of the body, an even disposition of mind, active employments; but, above all, wholesome food, taken only in sufficient quantities to satisfy the wants of nature, and abstinence from spirituous liquors.

Q. What is the cause of colds and rheumatisms?

A. When we are in a heated apartment, theatres, or other crowded assemblies, the pores of the skin are opened, and emit perspiration: by going from thence into the cool air, they are suddenly closed, and the natural perspiration of the body is stopped; the consequences of which are colds, rheumatisms, fevers, and other complaints.

Q. How may these effects be avoided?

A. We should be careful not to overheat ourselves; but when we do, we must continue in action till we cool gradually, taking care not to expose our bare skin, nor to drink any thing cold: if our feet or bodies be wet or cold, we ought, as soon as possible, to remove our wet clothes, to put on others made warm, and to continue in exercise for some time.

Q. If a person has swallowed poison, how may the fatal effects be counteracted?

A. When poison of any kind has been swallowed, and there is danger of its proving fatal before medical aid can be procured, the immediate object should be to excite vomiting; and some of the persons present should force a feather, a small stick, or any thing that can be

procured at the instant, down the throat, to irritate the parts till vomiting ensues: emetics are likewise to be administered as soon as they can be procured.

Q. What is the subsequent treatment?

A. After the contents of the stomach have thus been discharged, if the poison taken be *opium*, let vinegar, or lemon-juice diluted with about an equal quantity of water, be freely and copiously administered; but for *arsenic*, let a solution of soap and water be made as strong, and poured down as quickly as possible.

CHAP. XXVIII.

Geography.

Q. WHAT is Geography?

A. Geography is the science which makes us acquainted with the surface of the earth, its distribution into land and water, and the boundaries and productions of the various states.

Q. What names are given to the different portions of land?

A. The land consists of continents, islands, peninsulas, isthmuses, capes, and promontories.

Q. How is the water distinguished?

A. The water is composed of oceans, seas, gulfs, bays, streights, rivers, and lakes.

Q. Into how many parts is the earth divided?

A. There are four great divisions of the earth, commonly called the four quarters of the globe; namely, *Europe*, *Asia*, *Africa*, and *America*; each of which is divided into empires, kingdoms, principalities, duchies, and provinces, or counties.

Q. Which are the principal independent states of Europe?

A. From north to south Europe is divided into Russia, Sweden, Denmark, Prussia, Poland, Austria, Bavaria, Saxony, the Netherlands, France, Spain, Portugal, Italy, Naples, Turkey, and Great Britain and Ireland.

Q. What are the territories that compose the British empire?

A. The British empire is composed of two large islands, Great Britain and Ireland, besides several smaller ones: Ireland is 300 miles long; and Great Britain is 700 long and 200 broad, including Scotland and Wales, which were formerly, as well as Ireland, independent states.

Q. Which is the seat of government?

A. The capital of the British empire and the seat of government is London, one of the largest cities in the world, containing more than a million of inhabitants: Edinburgh is the chief city of Scotland; and Dublin, that of Ireland.

Q. What are the principal countries of Asia?

A. Asia contains Siberia, Tartary, Asiatic Turkey, Syria, Arabia, Persia, India, Thibet, China, and the vast islands of Japan, Borneo, Ceylon, New Holland, the Philipppines, &c.

Q. What are the countries in Africa?

A. Africa consists of Morocco, Algiers, Tunis, and Tripoly, on the coast of Barbary; Egypt, Abyssinia, Nubia, Negroland, Zaara, Guinea, Caffraria, and the country of the Hottentots, in which is situate the colony of the Cape of Good Hope.

T. Name the principal countries in America.

P. America is divided into North and South:

former comprehends the United States, Canada, Nova Scotia, and the empire of Mexico; and the latter, Terra Firma, Guiana, Brasil, Amazonia, Chili, Peru, Paraguay, and Patagonia.

Q. Which is the first, in point of rank, of the four quarters of the globe?

A. Europe, though smaller in extent, and less favoured in climate and soil than the rest of the world, claims the superiority; having, by means of the industry and genius of its inhabitants, attained to the dominion over a great portion of the globe: it is also distinguished as the seat of the arts, sciences, and commerce, and the nursery of politeness and civilization.

Q. For what is Asia celebrated?

A. Asia is populous and fertile; and is famous for being the birth-place of our first parents, the scene of scripture history, and where our Saviour performed his miracles, and wrought the glorious work of our redemption.

Q. What is remarkable of Africa?

A. The greatest part of Africa is burned by a scorching sun, which renders it unhealthy and unfavourable to the civilization of man: the inhabitants are black, and wild beasts numerous and ferocious.

Q. What do you observe of America?

A. America, also called the New World from its being unknown to the ancients, was discovered by Christopher Columbus, a Genoese in the employ of Spain, in 1492: the sea-coasts are chiefly peopled by colonies from Europe, but the interior is still inhabited by nations of Indians of a copper colour.

Q. For what reasons ought geography to be studied?

A. Besides the attractions to the study of geography, by being made acquainted with the character, mode of living, and manners of the most distant nations, it is impossible without some knowledge of it, to study politics, commerce, or history, with any advantage. *Geography* and *chronology* have been called the two eyes of *history*.

CHAP. XXIX.

Chronology.

Q. WHAT is Chronology?

A. Chronology is the science that teaches us how to compute time, distinguish its parts, and adjust past events to their proper periods.

Q. What are the divisions of time?

A. Time is usually computed by years, months, weeks, days, hours, minutes, and seconds; and by these, the larger divisions of epochs, ages, lustrums, olympiads, and cycles are measured.

Q. What proportion do these smaller divisions bear to each other?

A. A *year* consists of 12 *months* or 52 *weeks*; a week has 7 *days*; a day is divided into 24 *hours*; each hour into 60 *minutes*; and each minute into 60 *seconds*.

T. Repeat the names of the 12 months.

P. The months succeed each other in the following order: January, February, March, April, May, June, July, August, September, October, November, December.

Q. From what are the names of the seven days of the week derived?

A. The names of the days of the week are

derived from the objects of worship of our Saxon ancestors.

T. Repeat their names and derivation.

P. Sunday was so called, from their worshipping the *Sun* on that day; Monday, from the *Moon*; Tuesday, from *Tuisco*, a German hero; Wednesday, from *Woden*, their god of battle; Thursday, from *Thor*, the god of winds and weather; Friday, from *Friga*, the goddess of peace; and Saturday, from *Seater*, their god of freedom.

Q. What are the names given to the different seasons of the year?

A. The four seasons are called Spring, Summer, Autumn, and Winter.

Q. When does each season commence?

A. Spring begins on the 20th of March; Summer on the 21st of June; Autumn on the 23d of September; and Winter on the 21st of December.

Q. What is an *epoch*?

A. An epoch is the fixed period of a certain great event, from which other events are computed: thus, the Christian epoch is the birth of Christ; and, when we write 1820, we mean the one thousand eight hundred and twentieth year since the birth of our Saviour.

T. Explain the meaning of some of the other divisions.

P. An *age* or *century*, is one hundred years; a *lustrum* is a Roman period of five years; an *olympiad*, a space of four years, used by the Greeks; a *cycle of the sun*, is a revolution of twenty-eight years; and a *cycle of the moon*, a period of nineteen years.

CHAP. XXX.

History.

Q. WHAT is meant by History?

A. History is an account of past transactions, related with such important circumstances as are proper to be transmitted to posterity.

Q. What dispositions ought we to bring to the study of history?

A. This noble branch of literature has always been a favorite study with persons of every age and profession: the student must make himself master of the details of geography, must carefully discriminate between truth and falsehood, and not direct his chief attention to frivolous anecdotes, but to the methods which led to the glory of states, and the miscarriages which contributed to their ruin.

Q. How is the study of history divided?

A. History is divided into sacred, ecclesiastical, and profane.

Q. What are sacred and ecclesiastical history?

A. Sacred history is the relation of the events contained in the Bible; ecclesiastical history records the progress of the Christian religion, as well as of the different sects of which it is composed, and the infidels who have departed from it.

Q. What is profane history?

A. Profane history is the narrative of the events that have occurred in every nation, in a civil, military, and political point of view: it is divided into *ancient*, comprehending from the Creation to the birth of Christ; and *modern*, from that period to the present time.

Q. What are the principal events in ancient history?

A. After the universal *deluge*, the *Assyrian*, *Persian*, and *Macedonian* empires successively arose upon the ruins of each other; and, shortly after the destruction of the last, the *Roman* empire spread its dominion over almost all the then known world, and was at the height of its power when Christ came into the world.

T. Relatesome of the events in modern history.

P. The Roman empire was dismembered by the invasion of the Goths and other barbarous northern nations; but the principal part was again reunited by Charlemagne, A.D. 800: since his time the kingdoms of Europe had preserved an almost uniform extent, till the French empire arose in 1804, by the abilities and great military talent of Napoleon Buonaparte.

Q. What part of history has the first claim to our attention?

A. The history of our own country undoubtedly claims the preference from every Briton.

Q. What are the principal epochs in British history?

A. Britain, after being subject to the Romans during 500 years, was subdued by the Saxons, a warlike nation, who had been invited against the Picts and Scots: the Danes next established their dominion, but soon gave way to the Saxons, whose power was however shortly after overturned by the Normans, under William the Conqueror, who was crowned king of England in 1066.

Q. What are the most remarkable events since the conquest?

A. The warlike princes Edward III. and

Henry V. for a short time made France subject to England: in 1654, Oliver Cromwell abolished the regal power: the revolution took place in 1688: Scotland was united to England in 1707, under the name of Great Britain; and Ireland was united in 1801.

CHAP. XXXI.

Mythology.

Q. WHAT is Mythology?

A. Mythology is an account of the fables invented by the ancients, in honour of their false gods and heroes.

Q. From what causes is idolatry supposed to have taken rise?

A. The descendants of Noah having forgotten the traditions of their origin and of God's mercies, first adored the sun, moon, &c. on account of the benefits received from them, then deified those great men who had illustrated themselves by their virtues or public services, till in process of time there was scarcely any thing, but the weakness or caprice of mankind elevated to the rank of a deity.

Q. Why is a knowledge of these fabulous accounts necessary?

A. Some acquaintance with mythology is necessary, in order to study to advantage the ancient authors of Greece and Rome, whose works abound with allusions to these divinities, which they worshipped under a variety of names.

T. Mention the names of the principal heathen divinities.

P. The most powerful of the heathen gods was Jupiter; and, after him, Pluto, Neptune, Mars, Bacchus, Apollo, Saturn, Mercury; and the goddess Juno, Vesta, Ceres, Minerva, Diana, Venus, with many others who were supposed to preside over rivers, fountains, fields, houses, &c.

CHAP. XXXII.

Biography.

Q. WHAT is Biography?

A. Biography is the record of the lives of men who have rendered themselves illustrious by their talents, their virtues, or their vices.

Q. What is the use and object of this study?

A. Biography is a very entertaining and instructive species of history, as it represents great men more distinctly, by descending into a detail of their actions and character; thereby instructing us by example rather than precept, to imitate their good actions, and avoid those which we see censured and punished.

T. Mention some of the most illustrious geniuses that have adorned this country.

P. The great men of Britain claim pre-eminence in every department of learning and science. *Shakspeare, Milton, Dryden, Pope, and Thomson*, have been famous in poetry; *Bacon, Locke, and Newton*, in mathematics and philosophy. *More, Tillotson, Addison, Watts, and Johnson*, in morality; *Littleton, Goldsmith, Gibbon, Hume, and Mitford*, in History; *Hogarth, Reynolds, and West*, in painting; and *Chatham, Burke, Pitt, and Fox*, in politics and oratory.

CHAP. XXXIII.

Government and Laws.

Q. WHAT is meant by Government?

A. Government means a superior power constituted for the public good; and that plan of government, and system of laws, under which a people live together in the same society, is called a *Constitution*.

Q. Are there not different kinds of governments?

A. A government may be either a *monarchy*, in which one man governs; an *aristocracy*, in which the nobles govern; a *democracy*, where the people rule; or a *mixed* combination of these three, as in the government of Great Britain and Ireland.

Q. How is this country governed?

A. The government of Great Britain is vested in a chief magistrate, or king; about 400 peers or nobles forming the house of lords; and 658 members of the house of commons, representing the people: these three estates constitute together what is called *Parliament*.

Q. Is not this division of power admirably adapted to the enjoyment of liberty?

A. The British constitution is the noblest plan of political wisdom that ever was produced: by balancing the interest of the king and the people, it allows the greatest enjoyment of liberty, at the same time ensuring the utmost security of property; it should therefore be studied, supported, and defended, by every Briton who loves peace, freedom, and independence.

T: Mention some of the privileges that are the common birthright of all.

P. The public rights, liberties, and good government of the people, are secured by the following laws of the British constitution, contained in Magna Charta, the Habeas Corpus Act, and the Bill of Rights:

1. No law can be made, without the consent of the representatives of the people in the house of commons.

2. No tax can be imposed or levied, without the consent of that house.

3. No person can be imprisoned but by legal authority.

4. No man can be punished for an offence, without the consent of twenty-four of his peers or equals; namely, of twelve of a grand jury, who find cause for trying him; and twelve of a petty jury, who declare him guilty.

Q. By whom are the laws put in execution?

A. The power of executing the laws is vested in the King, who governs by his *ministers*, and administers justice by his *judges*, in the courts of King's Bench, Exchequer, and Common Pleas; and at assizes held twice a year by two judges in every county-town.

Q. In whom is the government of counties, cities, boroughs, and villages vested?

A. Counties are governed by *sheriffs*, lord-lieutenants, and justices of peace; cities and towns by a *mayor*, *aldermen*, and *common council*; and villages by *bailiffs* and *constables*, beside being subject, on any complaint, to the *lord* of the *manor* and the county magistrates.

T. Describe the course of law in the punishment of offenders.

P. A man who has committed a crime, is charged with it before a justice of the peace, who issues his warrant to the constable for his apprehension, and then commits him to the custody of the sheriff in the county goal, on the oath of the accuser.

Q. What is the next proceeding?

A. The accuser repeats his charge at the assizes before the grand jury, and if they find a true bill, the culprit is tried before the petit jury: if these find him guilty, he is said to be convicted, and receives from the judge the sentence of the law.

Q. How are punishments inflicted?

A. Death is inflicted by hanging: convicts sentenced to transportation, are sent to Botany Bay, in New Holland, or are employed in England on board of old ships called hulks: inferior offenders are confined in houses of correction, and kept to hard labour.

CHAP. XXXIV.

Ecclesiastical Government.

Q. WHO is the supreme head of the Church of England?

A. The king of Great Britain is the supreme head of the church; Henry VIII having assumed that title when he threw off his dependence on the Pope of Rome.

Q. By whom is it governed under the king?

A. The church is under the direction of two archbishops, twenty-four bishops, twenty-six deans and chapters, sixty archdeacons, 544

prebendaries and *canons*, and about 10,000 *rectors* and *vicars*, besides a considerable number of *curates*.

Q. What is the power and office of the archbishops?

A. The power of these high dignitaries is very extensive, and their rank is above all temporal lords: it is their privilege to crown the sovereign, to hold courts, to assemble the clergy, to consecrate bishops, and to watch over their conduct as well as over that of the inferior clergy.

Q. What are the duties of bishops, deans and chapters, and archdeacons?

A. Bishops sit in the house of peers, and have liberal revenues to support their dignity: they ordain priests, confirm, consecrate churches and burial grounds, and in visiting the clergy and managing the affairs of the diocese, are assisted by the archdeacon and the dean and chapter.

Q. What is the office of rectors, vicars, and curates?

A. Rectors and vicars, called the parochial clergy, are a valuable body of men, whose office it is to perform divine service in their respective churches; to marry, bury, and baptise; to administer the sacrament, visit the sick, and watch over the spiritual interests of their congregation: these duties they often perform through their assistants, called curates, who are paid for that purpose.

Q. What are the subordinate officers of a parish?

A. In each parish are *churchwardens*, whose business it is to keep the church in repair, and provide the sacramental bread and wine; *over-*

seers of the poor, who are to raise a competent sum for the relief of the poor, aged, and blind; and a *parish-clerk*, who is to assist the clergyman in all that relates to the duty of the church, and be the medium of communication between him and the parishioners.

CHAP. XXXV.

Heraldry.

Q. WHAT is Heraldry?

A. Heraldry is the science which teaches how to blazon, or explain in proper terms, all that belongs to coats of arms.

T. Explain some of the terms used in heraldry.

P. The space enclosing the armorial figures is called the *escutcheon* or shield, being usually of that shape: the figures themselves are called *charges*, and are either *ordinaries*, which divide the shield, or *common* charges of beasts, birds, &c. the different colours or *tincture* of which have appropriate names.

Q. What are the tinctures used in heraldry?

A. Gold, or yellow, is called *or*; silver, or white, *argent*; red, *gules*; blue, *azure*; black, *sable*; green, *vert*; purple, *purpure*; besides the furs called *ermine*, white spotted with black; and *ermine*s, black fur spotted with white.

Q. Are there not distinctive marks for arms of the different branches of a family?

A. Each son is distinguished by a distinctive mark, called a *difference*: that of the eldest is a *label*, with three points; the second son bears a *crescent*, or half moon; the third, a *mullet*, or

star of five points; the fourth, a *martlet*, or bird without legs; the fifth, an *annulet*, or ring; and the sixth, a *fleur-de-lis*.

Q. What is the object and use of the science?

A. Coats of arms serve to denote the descent and alliance of families, as the badges originally bestowed by sovereigns on individuals for military valour, or some signal service, are still borne as trophies by their descendants; it should therefore be studied and understood by persons whom birth or alliance entitles to these honourable distinctions.

CHAP. XXXVI.

Language.

Q. WHAT is meant by Language?

A. Language is human speech, or the communication of our thoughts, by the articulate sounds of the voice.

Q. From what is language supposed to have been derived?

A. The invention of words probably arose from the imitation, as nearly as could be carried, of the nature or quality of the object which was named: thus, a serpent is said to *hiss*, a fly to *buzz*, falling timber to *crash*, wind to *whistle*, thunder to *roar*, and a certain bird is called a *cuckoo*, from the noise or sound it respectively makes.

Q. Have all nations the same language?

A. We learn, from the Holy Writings, that mankind used but one language, till their dispersion on attempting to build the tower of Babel (*Genesis xi. chap. 11.*): but languages at

present vary exceedingly, each kingdom, and even smaller districts, having one peculiar to itself.

Q. What division is made of languages?

A. Languages are either such as were formerly spoken by ancient nations, but which being now extinct, are called *dead languages*, as, Latin and Greek; or those which are still used by modern nations, and therefore called *living languages*.

Q. Is the study of languages of much utility?

A. Nothing so much excites in us the love of learning and research, or extends more our mental faculties, than the study of different languages: it makes us acquainted with the riches of other nations, and as it were hold converse with the whole world: hence the Emperor Charles V. observed, that "a man is so many times a man, as he knows different languages:" the study of our own, however, is of primary importance.

CHAP. XXXVII.

Writing.

Q. WHAT is the meaning of the term Writing?

A. Writing means the art of expressing our thoughts by visible signs called characters: it is an admirable invention, by which we are able to give permanency to our fleeting ideas, to communicate with each other when absent, and to propagate and preserve knowledge, expressing thousands of words by the simple combination of twenty-five or twenty-six letters.

Q. By what gradations has writing attained to its present state of perfection?

A. The first written signs of words were the pictures of the things meant to be expressed: these were soon changed for hieroglyphics, or symbolical characters; as, an eye, for knowledge; an ant, for wisdom; a circle, without beginning or end, for eternity, &c.

Q. What was its next progress?

A. From hieroglyphics, writing advanced to simple marks, which stood for things without any resemblance to the object signified; and these arbitrary characters being adapted to the sounds of the voice, produced letters which some happy genius taught men to apply to all the different words used in speech.

Q. The original inventor of writing then remains unknown?

A. All that can be ascertained is, that writing is of great antiquity, God himself having given Moses the ten Commandments written on two tables of stone: it is admitted that Cadmus, king of Thebes, brought *letters* from Phœnicia into Greece, from whence they were dispersed over the western parts of the world.

Q. What have been the materials used for writing in different ages?

A. The oldest writing of antiquity is on pillars and tables of stone; after which were used plates of the softer metals, such as lead; or tables of wax scratched on with an iron point: to these succeeded the prepared leaves of trees and plants, and skins of parchment; but it was not till about 500 years ago, that our present method of writing on paper was invented.

CHAP. XXXVIII.

Grammar.

Q. WHAT is Grammar?

A. Grammar is the art of speaking and writing with propriety.

Q. Of how many parts does it consist?

A. Grammar is divided into four parts: *Orthography*, which teaches the spelling of words; *Etymology*, which shows their use and inflections; *Syntax*, their construction in a sentence; and *Prosody*, their true pronunciation.

Q. Of what are words composed?

A. Words are formed of letters and syllables.

Q. How many letters are there in English?

A. The English language has twenty-six letters; of which six are named vowels, viz. *a, e, i, o, u*, and *y*: all the rest are consonants.

Q. How many kinds of words are there?

A. There are nine sorts of words, called parts of speech; namely, the Article, the Substantive or Noun, the Adjective, the Pronoun, the Verb, the Adverb, the Preposition, the Conjunction, and the Interjection.

Q. What are Articles?

A. Articles are words prefixed to substantives, to show the extent of their signification: there are only two, *a* and *the*: the former called the *indefinite*, and the latter the *definite* article.

Q. What is a Substantive?

A. A Substantive or noun is the name of any person, place, or thing; as, *John, London, happiness*: it may either be masculine or feminine; singular or plural; and in the nominative, possessive, and objective case.

Q. What is an Adjective?

A. An Adjective is a word that expresses the quality of a substantive; as, "a *good* boy, a *sweet* apple:" it is subject to comparison by a positive, comparative, and superlative degree; as, *sweet, sweeter, sweetest*.

Q. What is the use of Pronouns?

A. Pronouns serve to shorten discourse by being used instead of nouns; as, "The horse is valuable; *he* is strong, and *he* is active:" There are personal pronouns; as, *I, thou, he, she, it*; relative, as, *who, which, that*; and adjective pronouns, as, *one, other, any, &c.*

Q. What are Verbs?

A. Verbs are words denoting being, action, or passion; as, "I am, I love, I am loved:" the regular combination of their moods, tenses, numbers, and persons, is called a conjugation; and they may be conjugated either *actively*, as, "I teach;" or *passively*, as, "I am taught."

Q. What is an Adverb?

A. An Adverb is a word added to other parts of speech, to express the time, manner, or other circumstances of an action; as, "He learns *quickly* and *correctly*. She is *diligently* employed."

Q. What is the office of Prepositions?

A. Prepositions serve to connect words with one another, by expressing the relation between them; as, "He went *from* home *with* me. They failed *through* inattention."

Q. What is a Conjunction?

A. Conjunctions are words that join the parts of a sentence together: they are either conjunctive, as, "He *and* his brother;" or dis-

junctive, as, "*Neither fame nor fortune will avail without virtue.*"

Q. What are Interjections?

A. Interjections may not properly be considered as forming a distinct class of words, being only the sudden expressions of joy, grief, surprise, or some other strong emotion; as, *Oh! Alas! Fie! Hail!*

CHAP. XXXIX.

Logic.

Q. WHAT is Logic?

A. Logic is the art of thinking and reasoning correctly; teaching us how to distinguish between truth and error, and also between truth and only the appearance of it.

Q. By what means shall we attain to the habit of correct thinking and speaking?

A. We must not conceive of things in a confused heap, but clearly and distinctly, in all their properties and relations; and we must dispose our ideas in some method, which may be easy and useful for the understanding and memory.

Q. How may we succeed in writing correctly and with precision?

A. When about to write on any subject, it is necessary to examine it with attention, and to become thoroughly acquainted with it; for it is impossible we should communicate a thing clearly to others, which we do not ourselves properly conceive: while doing this, it will be useful to note down the leading hints and facts, to assist the recollection during the composition.

Q. By what rules must we be directed in researches after truth?

A. In our investigation of truth, we must carefully observe individual facts and objects, and draw our conclusions from the whole by inductions, reasonings, and proofs; but in order to discover whether a reasoner deceives himself or others, logicians have invented a method, called *sylogism*.

T. Explain the nature of a sylogism.

P. A sylogism is a sentence made up of three propositions, so disposed, that the last is necessarily inferred from the two former: the first is called the *major*; the second, the *minor*; and the third, the *consequence*.

T. Give me an example of a sylogism.

P. *Major*.—Every creature possessed of reason and liberty, is accountable for his actions.

Minor.—Man is a creature possessed of reason and liberty.

Consequence.—Therefore, man is accountable for his actions.

CHAP. XL.

Rhetoric.

Q. WHAT is the use and object of Rhetoric?

A. Rhetoric teaches us to arrange the arguments of a discourse to the best advantage; and by the use of suitable figures and illustrations to please, persuade, and affect the passions of our hearers or readers.

Q. What are the rhetorical divisions of a discourse?

A. The parts of which a discourse is composed, are generally six; viz. the Exordium, the Narration, the Proposition, the Confirmation, the Refutation, and the Peroration.

Q. What is the object of each of these parts?

A. In the *exordium* or introduction, the orator prepares the minds of his hearers by some plain truth, and solicits favour and attention.

2. The *narration* is the statement of the facts: it should be clear and distinct, and expressed in few words, without affectation.

3. In the *proposition*, is given the true state of the question; specifying the points maintained, and those in which the speaker differs from his adversary.

4. In the *confirmation*, the orator assembles all the proofs and arguments that can be adduced in his favour; and in,

5. The *refutation*, he answers and refutes the arguments and objections of his adversary.

6. The *peroration*, or conclusion, is the summoning up of the principal points; so as to fix in the minds of the auditors the objects of the discourse, and to dismiss them with a favourable impression of the subject and of the speaker.

Q. What rules must be observed in the formation of a discourse?

A. The chief merit of a discourse is elegance of language, which consists in using appropriate words and phrases, and attending to the harmony and easy flow of the construction.

Q. How should a discourse be delivered, so as to produce the greatest effects on the audience?

A. Gesture, or what is called action, is of the utmost importance in public speaking. The head

should be held up, and the speaker should look those whom he is addressing, in the face. The action must be easy, keeping pace with his voice, and adapted to the subject of his discourse: to attain this, he should attend to the looks and gestures in which indignation, compassion, &c. show themselves to most advantage in the common concerns of life.

CHAP. XLI.

Literature.

Q. WHAT are the chief departments of Literature?

A. The term Literature principally embraces compositions in prose and verse.

Q. What are the different kinds of *prose writing*?

A. Compositions in prose, are either historical, descriptive, didactic, or epistolary.

T. Describe their character and object.

P. *Historical* writing comprehends annals, memoirs, and lives; *descriptive*, paints the beauties of nature and art; *didactic*, inculcates the precepts of morality and religion; and *epistolary* writing consists in communicating our thoughts to others in letters, the style of which should be neat and correct, easy and unassuming.

Q. What was the state of literature among the ancients?

A. The Greeks were the fathers of literature, philosophy, and the arts; and they, as well as the Romans, carried them to a high pitch of excellence: statuary and architecture were so well

understood, that many of their monuments and statues stand unrivalled to the present day.

T. Mention some of the most celebrated Greek authors who have written in prose.

P. Herodotus is surnamed the father of history; in which department he was followed by Thucydides and Xenophon; Demosthenes and Isocrates have never been surpassed in eloquence; Plato, Æsop, and Epictetus, excelled in morality; Aristotle, in philosophy; Longinus, in criticism; and Euclid, Archimedes, and Pythagoras, in geometry and music.

Q. Who were the men of learning and genius among the Romans?

A. Rome produced many celebrated men; of whom Livy, Sallust, Justin, and Tacitus, were eminent in history; Julius Cæsar and Cicero in eloquence; Quintilian, in criticism; and Seneca, Pliny, and Plutarch, in moral philosophy.

T. Name some of the prose-writers who have illustrated themselves in our own country.

P. England can vie with any age or country, in the number of great men it has produced in every branch of knowledge.

In historical composition we have had Camden, Clarendon, Lyttleton, Hume, Gibbon, Robertson, and Gillies.

In philosophy, Bacon, Barrow, Boyle, Locke, Ray, Newton, Halley, and Bolingbroke.

In mathematics, Napier, Gregory, Briggs, Flamstead, Simson, Ferguson, Waring, and Hutton.

In divinity and morals, Tillotson, Addison, Johnson, Watts, Sherlock, Hawkesworth, Paley, and Blair.

In legislation, Coke, Blackstone, and Mansfield.

In romance, Richardson, Fielding, Defoe, Swift, Smollet, and Sterne.

And numerous others in every department of learning and science.

CHAP. XLII.

Poetry.

Q. WHAT is Poetry?

A. Poetry is the language of passion, or of the glow of fancy or effusion of soul, expressed in measured numbers called verse; the end and design of which is, to amuse the imagination, and powerfully to excite the feelings.

Q. Can the art of poetry be acquired?

A. Man, by nature, is both a poet and a musician; and it is to the neglect or cultivation of his natural talents, that his future taste and proficiency may be ascribed: music and song form the amusement of the savage tribes of America; and even their ordinary conversation is highly figurative and poetical.

Q. On what does the melody of English poetry depend?

A. Versification, in English, depends on the length and shortness of syllables, and on the number contained in a line: if the last syllables of two lines correspond in sound, it is called *rhyme*; but if not, the poetry is termed *blank verse*.

Q. What names are given to the different kinds of poetry?

A. Poetical compositions are classed under the heads of *epic*, or heroic, for reciting the ac-

tions of gods and heroes; *dramatic*, for tragedies and comedies; *didactic*, for teaching morality and science; *pastoral*, relating to rural life; *elegiac*, sentimental and affecting; *lyric*, for odes and songs; and *epigrammatic* or *satirical*, for witty and ludicrous productions.

Q. Was poetry much cultivated by the ancients?

A. Poetry has not yet attained among the moderns to the pitch of excellence which it had reached in the flourishing ages of Greece and Rome; so that the ancient authors still continue to be the sources from which we derive our poetical rules, and by which we form our ideas of perfection.

Q. Who are the most distinguished among the ancient poets?

A. The Hebrews had David, Isaiah, and others, whose sublime poetry is found in the Holy Bible: in Greece flourished Homer, the first and prince of poets, who wrote the two epic poems called the Iliad and Odyssey, which have never yet been surpassed; and Rome produced Virgil, Horace, Ovid, and Lucretius.

T. Mention some of the illustrious poets who have flourished in Britain.

P. Chaucer, called the father of English poetry; Ossian, a Scottish bard; Spencer, Shakespeare, our principal dramatic writer; Milton, the immortal author of Paradise Lost; Dryden, Pope, Thomson, Young, Collins, and Gray.

T. Name those who have excelled in the inferior departments of poetry.

P. In sentimental and didactic poetry we have had Cowper, Addison, Johnson, Goldsmith,

Armstrong, Mason, Beattie, and Watts; in pastoral, Shenstone, Cunningham and Ramsay; in lyrical, Cowley, Smith, and Burns; and in satirical poetry, Butler, Anstey, Churchill, and Wolcott.

CHAP. XLIII.

Philosophy.

Q. WHAT is meant by Philosophy?

A. Philosophy is the science of wisdom, or the knowledge of nature and her laws: it is by this study that we learn the cause of the phenomena that perpetually obtrude themselves upon our senses, and excite our admiration.

Q. Whence is the word philosophy derived?

A. Philosophy derives its name from the Greek words *philos*, *sopha*, signifying a lover of wisdom, or one who studies to know the nature and causes of all things.

Q. Into how many branches is this study divided?

A. Philosophy is divided into three parts: namely, *intellectual*, or *mental* philosophy; *moral* philosophy; and *natural* philosophy.

Q. What is mental philosophy?

A. Mental, or intellectual philosophy, teaches us the laws of our mind, and shows us the origin of our various modes and habits of thinking, and how these thoughts operate upon our actions: this branch of philosophy is also called *metaphysics*.

Q. What do you mean by the mind?

A. The mind is that part of our being which thinks, and feels, and wills: when any object

affects the eye, or the touch, it produces in the mind a feeling, which is called a *sensation*; a recurrence of the same sensations forms *ideas*; and these ideas may be recalled by the *memory*, even when the objects that produced them no longer act upon the senses.*

Q. Of what does moral philosophy treat?

A. The object of moral philosophy, called *Ethics*, is to form and direct men's manners, to explain the reason and nature of our actions, and to adapt them to our felicity here, and our eternal happiness hereafter.

Q. What is natural philosophy?

A. Natural philosophy makes us acquainted with the causes which produce the established order and course of things, deduced from reason and experience.

Q. What are the advantages derived from the study of philosophy?

A. There is no inquiry whatever more calculated to inspire every good disposition of mind, and make us wise and virtuous; or that points out a more rational path to the knowledge of the deity, than the study of nature, morals, and the principles of reason.

* See also the manner in which objects become visible to the eye, under the article *Optics*. Chap. 24.

THE END.

R. Sharp, Printer, Romsey.

