with respect to the composition of the mouth parts, and by some authors the "palpi" have been termed the side pieces of the lower lip. In a dead dragon-fly the parts are closed on each other, and, for a just appreciation of their structure and power, it is necessary to take a living example in the fingers by the thorax, slight lateral pressure on which causes the insect to display the formidable arrangement. The prothorax is extremely small, consisting of only a narrow ring, the upper portion of which is often elevated into lobes. The rest of the thorax is very large, and consolidated into a single piece, with oblique sutures on the sides beneath the wings; the portion in front of the wings is extremely robust, and offers a median carina or suture above, and a broad transverse sinus posteriorly. The interalar portion is somewhat excavated, and on each side of it above are nodosities forming the attachments of the powerful muscles that work the wings; on each side is a large and distinct spiracle. The abdomen varies excessively in form, the two extremes being the filiform structure observable in most *Agrionidæ*, and the very broad and depressed formation seen in our familiar *Libellula depressa*. It consists of ten distinct segments, whereof the basal two and those at the apex are short, the others elongate, the first being excessively short. In a slit on the under side of the second in the male, accompanied by external protuberances, are concealed the genital organs: on the under side of the eighth in the female is a scale-like formation, indicating the entrance to the oviduct. The tenth is always provided in both sexes with prominent appendages, differing greatly in form, and often furnishing the best specific (and even generic) characters; by some authors these appendages are considered as representing a modified eleventh segment. The basal segments often have additional transverse sutures, and in the common triquetrous abdomen there is a fine longitudinal dorsal carina, and prominent lateral angles; invariably the ventral surface has a longitudinal membranous space connecting the here divided chitinous portion of the external skeleton. The legs vary in length and stoutness, but may, as a rule, be termed long and slender, and in a measure that appears disproportionate to the necessities of the insect; for a dragon-fly can scarcely be said to walk after the short promenade it takes on emerging from its puparium. The anterior pair probably assist in capturing and holding its insect prey, but the greatest service all the legs render is possibly in enabling the creature to rest lightly, so that it can quit a position of repose in chase of passing prey in the quickest possible manner, in which the majority of the species are aided also by the horizontally extended wings. The coxa is short and stout, followed by a still shorter trochanter; the femora and tibiæ long and slender, almost invariably furnished on their under surface with two series of strong spines, as also are the tarsi, which consist of three slender joints, the last having two long and slender claws, usually (but not invariably) with a small tooth internally below the tips; the palms are absent or nearly so, and naturally are not necessary in a non-ambulatory insect. The wings are always elongate, and furnished with strong longitudinal neuration and dense transverse nervules strengthening the already strong (although typically transparent) membrane. In the *Agrionidæ* both pairs are nearly equal, and are carried vertically and longitudinally in repose, and the neuration and membrane are less strong; hence the species of this family are not so powerful on the wing as are those of the other groups in which the wings are horizontally extended in a position ready for instant service. The neuration is peculiar, and in many respects without precise analogy in other groups of insects, but it is not necessary here to enter into more than some special points. On the costal margin (excepting in some *Calopterygina*) there is a small dark space limited by nervules, termed the pterostigma; and between this and the base of the wing is a point termed the "nodus," at which the sub-costal nervule is suddenly arrested. The arrangement of the nervures at the base of the wing is very singular, and slight differences in it form useful aids to classification. In the *Æschnidæ* and *Libellulidæ* this arrangement results in the formation of a triangular space (known as the "triangle"), which is either open or traversed by nervules; but in many *Agrionidæ* this space, instead of being triangular, is oblong or elongately quadrate, or with its upper edge partly straight and partly oblique. This fixitude of type in neuration is not one of the least important of the many peculiarities exhibited in these insects.

The internal structure is comparatively simple. The salivary glands appear to be absent, and the whole digestive apparatus consists of an elongate canal extending from mouth to anus, comprising the œsophagus, stomach, and intestine, with certain dilatations and constrictions; the characteristic Malpighian vessels are stated to number about forty, placed round the posterior extremity of the stomach. Dragon-flies eat their prey completely, and do not content themselves by merely sucking its juices; the harder portions are rejected as elongate, nearly dry, pellets of excrement.

But the most extraordinary feature in the economy,—one which has attracted the attention of naturalists from remote times,—is the position of the genital organs, and the corresponding anomalous manner in which the pairing of the sexes and impregnation is effected. In the male the intromittent organ is (as stated above) situated in a slit on the under surface of the second abdominal segment; it is usually very crooked or sinuous in form, and is accompanied by sheaths, and by external hooks or secondary appendages, and also by seminal vessels. But the ducts of the vessels connected with the testes unite and open on the under surface of the ninth segment; hence, before copulation can take place, it is necessary that the vessels in the second segment be charged from this opening, and in the majority of cases this is done by the male previously to seeking the female. In the latter sex the entrance to the oviduct and genital organs is on the under surface of the eighth abdominal segment. The act of pairing may be briefly stated as follows. The male, when flying, seizes the prothorax of the female with the strong appendages at the extremity of the abdomen, and the abdomen of this latter sex is then curved upward so as to bring the under side of the eighth segment into contact with the organs of the second segment of the male. This act must have been observed by all, though but few non-entomologists are acquainted with the reasons for this most extraordinary position. In the more powerful *Libellulidæ*, &c., the act is of short duration, and it is probable that polygamy and polyandry exist, for it possibly requires more than one almost momentary act to fertilize all the eggs in the ovaries of a female. But in many *Agrionidæ*, and in some others, the male keeps his hold of the prothorax of the female for a lengthened period, retaining himself in flight in an almost perpendicular manner, and it may be that the deposition of eggs and pairing goes on alternately. There is, however, much yet to be learned on these points. The gravid female usually lays her eggs in masses (but perhaps sometimes singly), and the operation may be witnessed by any one in localities frequented by these insects. She hovers for a considerable time over nearly the same spot, rapidly dipping the apex of her abdomen into the water, or at any rate touching it, and often in places where there are no water-weeds, so that in all probability the eggs fall at once to the bottom. But in some of the *Agrionidæ* the female has been often noticed

by trustworthy observers to creep down the stems of aquatic plants several inches below the surface, emerging after the act of oviposition has been effected; and in the case of *Lestes sponsa*, Von Siebold saw the male descend with the female. The same exact observer noticed also in this species that the female makes slight incisions in the stems or leaves of water plants with the double serrated apparatus (vulva) forming a prolongation of the ninth segment beneath, depositing an egg in each excision. He has seen two pairs thus occupied beneath the surface on one and the same stem.

Fig. 1.—The anterior portion of the body of *Æschna cyanea* freed from the puparium.

Fig. 2.—The tail being extricated.

The duration of the sub-aquatic life of a dragon-fly is no doubt variable, according to the species. In the smaller forms it is probably less than a year, but precise evidence is wanting as to the occurrence of two broods in one year. On the other hand, it is certain that often a longer period

Fig. 3.—The whole body extricated.

is requisite to enable the creature to attain its full growth, and three years have been stated to be necessary for this in the large and powerful *Anax formosus*. Like all insects with incomplete metamorphoses, there is no quiescent pupal condition, no sharp line of demarcation between the larval and so-called "nymph" or penultimate stage. The creature goes on eating and increasing in size from the moment it emerges from the egg to the time when it leaves the water to be transformed into the aerial perfect insect. The number of moults is uncertain, but they are without doubt numerous. At probably about the antepenultimate of these operations, the rudimentary wings begin to appear as thoracic buddings, and in the full-grown nymph these wings overlap about one-half of the dorsal surface of the abdomen. In structure there is a certain amount of resemblance to the perfect insect, but the body is always much stouter and shorter, in some cases most disproportionately so, and the eyes are always separated; even in those genera (*e.g.*, *Æschna*) in which the eyes of the imago are absolutely contiguous, the most that can be seen in the larva is a prolongation towards each other, and there are no ocelli. The legs are shorter and more fitted for crawling about water plants and on the bottom. In the mouth parts the mandibles and maxillæ are similar in form to those of the adult, but there is an extraordinary and unique modification of the lower lip. This is attached to an elongate and slender mentum articulated to the

Fig. 4.—The perfect insect (the wings having acquired their full dimensions) resting to dry itself, preparatory to the wings being horizontally extended.

posterior portion of the lower surface of the head, slightly widened at its extremity, to which is again articulated the labium proper, which is very large, flattened, and gradually dilated to its extremity; but its form differs according to group as in the perfect insect. Thus in the *Agrionidæ* it is deeply cleft, and with comparatively slender side-pieces (or palpi), and strongly developed articulated spines; in the *Æschnidæ* it is at the most notched, with narrow side-pieces and very strong spines; in the *Libellulidæ* it is entire, often triangular at its apex, and with enormously developed palpi without spines, but having the opposing inner edges furnished with interlocking serrations. The whole of this apparatus is commonly termed the mask. In a state of repose it is applied closely against the face, the elongated mentum directed backward and lying between the anterior pair of legs; but when an approaching victim is seen the whole apparatus is suddenly projected, and the prey caught by the raptorial palpi; in some large species it is capable of being projected fully half an inch in front of the head. The prey, once caught and held by this apparatus, is devoured in the usual manner. There are two pairs of thoracic spiracles, but respiration is mostly affected by a peculiar apparatus at the tail end, and

there are two different methods. In the *Agrionidæ* there are three elongate flattened plates, or false gills, full of tracheal ramifications, which extract the air from the water, and convey it to the internal tracheæ (in *Calopteryx* these plates are excessively long, nearly equalling the abdomen), the plates also serving as means of locomotion. But in the other groups these external false gills are absent, and in their place are five valves, which by their sudden opening and closing force in the water to the rectum, the walls of which are furnished with branchial lamellæ. The alternate opening and closing of these valves enables the creature to make quick jerks or rushes (incorrectly termed "leaps") through the water,[1] and, in conjunction with its mouth parts, to make sudden attacks upon prey from a considerable distance. The lateral angles of the terminal abdominal segments are sometimes produced into long curved spines. In colour these larvæ are generally muddy, and they frequently have a coating of muddy particles, and hence are less likely to be observed by their victims. If among insects the perfect dragon-fly may be termed the tyrant of the air, so may its larva be styled that of the water. Aquatic insects and larvæ form the principal food, but there can be no doubt that worms, the fry of fish, and even younger larvæ of their own species, form part of the bill of fare. The "nymph" when arrived at its full growth sallies forth from the water, and often crawls a considerable distance (frequently many feet up the trunks of trees) before it fixes itself for the final change, which is effected by the thorax splitting longitudinally down the back, through which fissure the perfect insect gradually drags itself. The figures on last page indicate this process as observed in *Æschna cyanea*.

For a considerable time after its emergence a dragon-fly is without any of its characteristic colours, and is flaccid and weak, the wings (even in those groups in which they are afterwards horizontally extended) being held vertically in a line with the abdomen. By degrees the parts harden, and the insect essays its first flight, but even then the wings have little power and are semi-opaque in appearance, as if dipped in mucilage. In most species of *Calopterygina*, and in some others, the prevailing colour of the body is a brilliant bronzy green, blue, or black, but the colours in the other groups vary much, and often differ in the sexes. Thus in *Libellula depressa* the abdomen of the fully adult male is covered with a bluish bloom, whereas that of the female is yellow; but several days elapse before this pulverulent appearance is attained, and a comparatively young male is yellow like the female. The wings are typically hyaline and colourless, but in many species (especially *Calopterygina* and *Libellulina*) they may be wholly or in part opaque and often black, due apparently to gradual oxydization of a pigment between the two membranes of which the wings are composed; the brilliant iridescence, or metallic lustre, so frequently found is no doubt due to interference—the effect of minute irregularities of the surface—and not produced by a pigment. A beautiful little genus (*Chalcopteryx*) of *Calopterygina* from the Amazon is a gem in the world of insects, the posterior wings being of the most brilliant fiery metallic colour, whereas the anterior remain hyaline.

These insects are pre-eminently lovers of the hottest sunshine (a few are somewhat crepuscular), and the most powerful and daring on the wing in fine weather become inert and comparatively lifeless when at rest in dull weather, allowing themselves to be captured by the fingers without making any effort to escape. Many of the larger species (*Æschna*, &c.) have a habit of affecting a particular twig or other resting place like a fly-catcher among birds, darting off after prey and making long excursions, but returning to the chosen spot. Mr Wallace, in his *Malay Archipelago*, states that the inhabitants of Lombock use the large species for food, and catch them by means of limed twigs.

They are distributed over the whole world excepting the polar regions, but are especially insects of the tropics. At the present day about 1700 species are known, dispersed unequally among the several sub-families as follows: *Agrionina*, 490 species; *Calopterygina*, 170 · *Gomphina*, 210; *Æschnina*, 150; *Cordulina*, 100; *Libellulina*, 580. In Europe proper only 100 species have been observed, and about 46 of these occur in the British islands. New Zealand is excessively poor, and can only number 8 species, whereas they are very numerous in Australia. Some species are often seen at sea, far from land, in calm weather, in troops which are no doubt migratory; our common *Libellula quadrimaculata*, which inhabits the cold and temperate regions of the northern hemisphere, has been frequently seen in immense migratory swarms. One species (*Pantala flavescens*) has about the widest range of any insect, occurring in the Old World from Kamtchatka to Australia, and in the New from the Southern States to Chili, also all over Africa and the Pacific islands, but is not found in Europe. The largest species occur in the *Æschnina* and *Agrionina*; a member of the former sub-family from Borneo expands to nearly 6½ inches, and with a moderately strong body and powerful form; in the latter the Central American and Brazilian *Megaloprepus cærulatus* and species of *Mecistogaster* are very large, the former expanding to nearly 7 inches, and the latter to nearly as much, but the abdomen is not thicker than an ordinary grass-stem and of extreme length (fully 5 inches in *Mecistogaster*). Among living entomologists the dragon-flies have received, and are receiving, great attention, especially from the Baron de Selys-Longchamps of Liége, and from Dr H. A. Hagen, formerly of Königsberg, now of Cambridge, Massachusetts.

It is impossible to prepare dragon-flies for the cabinet so as to retain all the brilliant colours the bodies have in life. They are excessively brittle when dry, and in the smaller species it is advisable to run a bristle into the under side of the thorax, pushing it down till it reach the extremity of the abdomen, when the other end can be cut off close to the thorax. But the larger species should be disembowelled through a slit along the under surface of the abdomen, and then filled (but not too tightly) with clean white cotton wool. The colours stand a much better chance of not greatly altering if the insects be not killed until some hours after they are captured, so as to allow the contents of the intestinal canal to be naturally passed away, for it is the decomposition of the food that assists materially to alter or obliterate the colour and markings.

Among fossil insects dragon-flies hold a conspicuous position. Not only do they belong to what appears to have been a very ancient type, but in addition, the large wings and strong dense reticulation are extremely favourable for preservation in a fossil condition, and in many cases all the intricate details can be as readily followed as in a recent example. In this country they have been found more especially in the Purbeck beds of Swanage, and the vales of Wardour and Aylesbury, in the Stonesfield Slate series, and in the Lias and Rhætic series of the west of England. But the richest strata appear to be those of the Upper Miocene at Œningen, in the Rhine valley; the Middle Miocene at Radoboj, in Croatia; the Eocene of Aix, in Provence; and more especially the celebrated Secondary rocks furnishing the lithographic stone of Solenhofen, in Bavaria. This latter deposit would appear to have been of marine origin, and it is significant that, although the remains of gigantic dragon-flies discovered in it are very numerous and perfect, no traces of their sub-aquatic conditions have been found, although these as a rule are numerous in most of the other strata, hence the insects may be regarded as having been drowned in the sea and washed on shore. Many of these Solenhofen species differ considerably in form from those now existing, so that Dr Hagen, who has especially studied them, says that for nearly all it is necessary to make new genera. A notice of fossil forms should not be concluded without the remark that indications of at least two species have been found in amber, a number disproportionately small if compared with other insects entombed therein; but it must be remembered that a dragon-fly is, as a rule, an insect of great power, and in all probability those then existing were able to extricate themselves if accidentally entangled in the resin.

[1] A similar contrivance was suggested and (if the writer mistakes not) actually tried as a means of propelling steam-ships.

See De Selys-Longchamps, *Monographie des Libellulidées d'Europe*, Brussels, 1840; *Synopses des Agrionines, Calopterygines, Gomphines, et Cordulines*, with Supplements, Brussels, from 1853 to 1877; De Selys-Longchamps and Hagen, *Revue des Odonates d'Europe*, Brussels, 1850; *Monographie des Calopterygines et des Gomphines*, Brussels, 1854 and 1858; Charpentier, *Libellulinæ europeæ*, Leipsic, 1840. (R. M'L.)

DRAGON'S BLOOD, a name applied to the resins obtained from several species of plants. *Calamus Draco* (Willd.), one of the Rotang or Rattan Palms, which produces much of the dragon's blood of commerce, is a native of Further India and the Eastern Archipelago. When young it grows erect, but with age it becomes climbing. The leaves are pointed, about a foot long, of a finger's breadth, and, like the stems, armed with spines. The flower has a three-cleft corolla, and the ovary is egg-shaped. The fruit is round, pointed, scaly, and the size of a large cherry, and when ripe is coated with the resinous exudation known as dragon's blood. The finest dragon's blood, called *jernang* or *djernang* in the East Indies, is obtained by beating or shaking the gathered fruits, sifting out impurities, and melting by exposure to the heat of the sun or by placing in boiling water; the resin thus purified is then usually moulded into sticks or quills (the *sanguis draconis in baculis* of pharmacy), and wrapped in reeds or palm-leaves, and is then ready for market. An impurer and inferior kind, sold in lumps of considerable size (*sanguis draconis in massis*), is extracted from the fruits by boiling. Dragon's blood is dark red-brown, nearly opaque, and brittle, contains small shell-like flakes, and gives when ground a fine red powder; it is soluble in alcohol, ether, and fixed and volatile oils, and in the pure condition has, according to F. W. Johnston (*Phil. Trans.*, 1839, p. 134), the composition $C_{20}H_{21}O_4$. If heated it gives off fumes of benzoic acid. In Europe it was once valued as a medicine on account of its astringent properties, and is now used for colouring plasters, dentrifice, and varnishes; in China, where it is mostly consumed, it is employed to give a red facing to writing paper. The drop dragon's blood of commerce, called *cinnabar* by Pliny (*N. H.* xxxiii. 39), and *sangre de dragon* by Barbosa, was formerly and is still one of the products of Socotra, the *Dioscoridis insula* of ancient geographers; it was known to the Arabs by the term *kâtir*, from which the name of the island may have been derived (see A. Sprengel, *Alte Geographie Arabiens*, 1875). It is the spontaneous exudation of a leguminous tree, *Pterocarpus Draco*, which grows at elevations between 800 and 2000 feet above sea-level (see Wellsted, *Journ. R. Geog. Soc.*, 1835, p. 198). Jacquin states (*Select. Stirpium Amer. Hist.*, p. 283, 1763) that the tree grows in the woods of Tierra Bomba, off Cartagena, in Colombia, and that dragon's blood, obtained from it by incision, was at one time imported into Spain for medicinal purposes. The dragon's blood of the Canary Islands is a tonic and astringent resin procured from the surface of the leaves and from cracks in the trunk of *Dracæna Draco*, a tree of the natural order *Liliaceæ*. The hardened juice of a euphorbiaceous tree, *Croton Draco*, a resin resembling kino, is the *sangre del drago* or dragon's blood of the Mexicans, used by them as a vulnerary and astringent.

Rumphius, *Herbarium Amboinense*, p. v. 114–119, tab. lviii., 1747; Flückiger and Hanbury, *Pharmacographia*, 1874.

DRAGUIGNAN, the chief town of the department of Var, in France, and of an arrondissement of the same name, on the River Pis, a branch of the Nartuby, lies at the foot of the wooded height of Malmont, in 43° 32′ 18″ N. lat. and 6° 27′ 56″ E. long. The préfecture, palace of justice, theatre, hospital, and prison are the most important public buildings. The town possesses a communal college, a training school for teachers, a botanical garden, a fine promenade, a library of about 18,000 volumes, collections of coins, pictures, and natural history objects, and an archæological society. The inhabitants, who in 1872 numbered 8177, are engaged in agriculture and the manufacture of wine, coarse cloth, earthenware, silk, soap, candles, oil, brandy, copper wares, and leather.

DRAINAGE. See AGRICULTURE, ARCHITECTURE, BUILDING, and SEWAGE.

DRAKE, SIR FRANCIS (*c.* 1545–1595), a celebrated English admiral, was born near Tavistock, Devonshire, about 1545 according to most authorities, but Barrow, in his life, says the date may have been as early as 1539. His father, a yeoman and a zealous Protestant, was obliged to take refuge in Kent during the persecutions in the reign of Queen Mary. He obtained a naval chaplaincy from Queen Elizabeth, and is said to have been afterwards vicar of Upnor Church, on the Medway. This, however, must be a mistake, as there is no evidence of any church ever having existed at Upnor. Young Drake was educated at the expense and under the care of Sir John Hawkins, who was his kinsman; and, after passing an apprenticeship on a coasting vessel, at the age of eighteen he had risen to be purser of a ship trading to Biscay. At twenty he made a voyage to Guinea; and at twenty-two he was made captain of the "Judith." In that capacity he was in the harbour of San Juan de Ulloa, in the Gulf of Mexico, where he behaved most gallantly in the actions under Sir John Hawkins, and returned with him to England, having acquired great reputation, though with the loss of all the money which he had embarked in the expedition. In 1570 he obtained a regular privateering commission from Queen Elizabeth, the powers of which he immediately exercised in a cruise in the Spanish Main. Having next projected an attack against the Spaniards in the West Indies to indemnify himself for his former losses, he set sail in 1572, with two small ships named the "Pasha" and the "Swan." He was afterwards joined by another vessel; and with this small squadron he took and plundered the Spanish town of Nombre de Dios. With his men he penetrated across the isthmus of Panama, and committed great havoc among the Spanish shipping. From the top of a tree which he climbed while on the isthmus he obtained his first view of the Pacific, and resolved "to sail an English ship in these seas." In these expeditions he was much assisted by a tribe of Indians, who were then engaged in a desultory warfare with the Spaniards. Having embarked his men and filled his ships with plunder, he bore away for England, and arrived at Plymouth on the 9th August 1573.

His success and honourable demeanour in this expedition gained him high reputation; and the use which he made of his riches served to raise him still higher in popular esteem. Having fitted out three frigates at his own expense, he sailed with them to Ireland, and rendered effective service as a volunteer, under Walter earl of Essex, the father of the famous but unfortunate earl. After the death of his

patron he returned to England, where Sir Christopher Hatton introduced him to Queen Elizabeth, and procured him a favourable reception at court. In this way he acquired the means of undertaking that grand expedition which has immortalized his name. The first proposal he made was to undertake a voyage into the South Seas through the Straits of Magellan, which no Englishman had hitherto ever attempted. This project having been well received at court, the queen furnished him with means; and his own fame quickly drew together a sufficient force. The fleet with which he sailed on this enterprise consisted of only five small vessels, and their united crews mustered only 166 men. Having sailed on the 13th December 1577, he on the 25th made the coast of Barbary, and on the 29th Cape Verd. He reached the coast of Brazil on the 5th of April, and entered the Rio de la Plata, where he parted company with two of his ships; but having met them again, and taken out their provisions, he turned them adrift. On the 29th May he entered the port of St Julian's, where he continued two months for the sake of laying in a stock of provisions. On the 20th August he entered the Straits of Magellan, and on the 25th September passed them, having then only his own ship. On the 25th November he arrived at Macao, which he had appointed as the place of rendezvous in the event of his ships being separated; but Captain Winter, his vice-admiral, had repassed the straits and returned to England. He thence continued his voyage along the coast of Chili and Peru, taking all opportunities of seizing Spanish ships, and attacking them on shore, till his men were satiated with plunder; and then coasted along the shores of America, as far as 48° N. lat., in an unsuccessful endeavour to discover a passage into the Atlantic. Having landed, however, he named the country New Albion, and took possession of it in the name of Queen Elizabeth. Having careened his ship, he sailed thence on the 29th September 1579 for the Moluccas. On the 4th November he got sight of those islands, and, arriving at Ternate, was extremely well received by the king. On the 10th December he made the Celebes, where his ship unfortunately struck upon a rock, but was taken off without much damage. On the 16th March he arrived at Java, whence he intended to have directed his course to Malacca; but he found himself obliged to alter his purpose, and to think of returning home. On the 25th March 1580 he again set sail; and on the 15th June he doubled the Cape of Good Hope, having then on board only fifty-seven men and three casks of water. He passed the line on the 12th July, and on the 16th reached the coast of Guinea, where he watered. On the 11th September he made the Island of Terceira, and on the 3d November he entered the harbour of Plymouth. This voyage round the world, the first accomplished by an Englishman, was thus performed in two years and about ten months. The queen hesitated for some time whether to recognize his achievements or not, on the ground that such recognition might lead to complications with Spain, but she finally decided in his favour. Accordingly, soon after his arrival she paid a visit to Deptford, went on board his ship, and there, after partaking of a banquet, conferred upon him the honour of knighthood, at the same time declaring her entire approbation of all that he had done. She likewise gave directions for the preservation of his ship, the "Golden Hind," that it might remain a monument of his own and his country's glory. After the lapse of a century it decayed and had to be broken up. Of the sound timber a chair was made, which was presented by Charles II. to the university of Oxford. In 1585, open hostilities having commenced with Spain, Drake sailed with a fleet to the West Indies, and took the cities of St Jago, St Domingo, Cartagena, and St Augustine. In 1587 he went to Lisbon with a fleet of thirty sail; and having received intelligence of a great fleet being assembled in the bay of Cadiz, and destined to form part of the Armada, he with great courage entered the port on the 19th April, and there burnt upwards of 10,000 tons of shipping,—a feat which he afterwards jocosely called "singeing the king of Spain's beard." In 1588, when the Spanish Armada was approaching England, Sir Francis Drake was appointed vice-admiral under Lord Howard, and made prize of a very large galleon, commanded by Don Pedro de Valdez, who was reputed the projector of the invasion, and who struck at once on learning his adversary's name.

It deserves to be noticed that Drake's name is mentioned in the singular diplomatic communication from the king of Spain which preceded the Armada:—

> Te veto ne pergas bello defendere Belgas;
> Quæ Dracus eripuit nunc restituantur oportet
> Quas pater evertit jubeo te condere cellas;
> Religio Papæ fac restituatur ad unguem.

To these lines the queen made this extempore response:—

> Ad Græcas, bone rex, fiant mandata kalendas.

In 1589 Drake commanded the fleet sent to restore Dom Antonio, king of Portugal, the land forces being under the orders of Sir John Norris; but they had hardly put to sea when the commanders differed, and thus the attempt proved abortive. But as the war with Spain continued, a more formidable expedition was fitted out, under Sir John Hawkins and Sir Francis Drake, against their settlements in the West Indies, than had hitherto been undertaken during the whole course of it. Here, however, the commanders again disagreed about the plan; and the result in like manner disappointed public expectation. These disasters were keenly felt by Drake, and were the principal cause of his death, which took place on board his own ship, near the town of Nombre de Dios, in the West Indies, January 28, 1595.

See Lives of Drake by Samuel Clarke (1671) and John Barrow, junr. (1843).

DRAKENBORCH, Arnold (1684–1748), a celebrated scholar and editor, was born at Utrecht on the 1st January 1684. Having studied belles-lettres under Grævius and Burmann, and law under Cornelius Van Eck, he succeeded Professor Burmann in 1716, and continued to hold his professorship till his death in 1748, in the sixty-fourth year of his age. His earliest work was a dissertation entitled *Disputatio philologico-historico de Præfectis urbis*, in 4to (1704), and its merit caused it to be reprinted at Frankfort, in 1752, by Professor Uhl, accompanied with a life of its learned author. His next work, entitled *Disputatio de officio præfectorum prætorio*, was published in 1707; and ten years afterwards he issued his edition of Silius Italicus (1717), undertaken at the suggestion of Burmann. In order to render this edition as perfect as possible, nothing was omitted; and many historical subjects were engraved for the purpose of elucidating the text, to which his own copious and learned annotations greatly contributed. But his splendid edition of Livy (Lugd. Batav. 1738 and 1746, 7 vols.), with a life of that historian, is that on which his fame as a scholar chiefly rests. The preface to this work is replete with erudition, and gives a particular account of all the literary men who have at different periods commented on the works of Livy. His edition is based on that of Gronovius; but he made many important alterations on the authority of manuscripts which it is probable Gronovius either had never seen, or had not taken the pains to consult. The edition is peculiarly rich in various readings, but the text is, of course, inferior to that which has been furnished by the skill of later editors. Upon the whole, this edition of Livy was, at the time of its publication, one of the most elaborate, interesting, and instructive that had ever been given to the world.

DRAMA

Drama (from δράω) signifies action. The term is applied to compositions which imitate action by representing the personages introduced in them as real and as employed in the action itself. The varieties of the drama differ more or less widely, both as to the objects imitated and as to the means used in the imitation. But they all agree as to the *method* or *manner* which is essential to the dramatic art, viz., *imitation in the way of action*.

The desire to give expression to feelings and conceptions is inseparable from human nature. Man expresses his thoughts and emotions by gesture and by speech, or by a combination of both; and these expressions he soon learns in the society of other men—and more especially on joyous or solemn occasions—to vary or regulate in dance and song. Another way of expression, often combined with the other, is imitation. To imitate, says Aristotle, is instinctive in man from his infancy; and from imitation all men naturally receive pleasure. Gesture and voice are means of imitation common to all human beings; and the aid of some sort of dress and decoration is generally within the reach of children, and of the childhood of nations. The assumption of character, whether real or fictitious, is therefore the earliest step towards the drama. But it is only a preliminary step; nor is the drama itself reached till the imitation extends to action.

Action, which man is not wont to attribute (except figuratively) to any but members of his own species and to the superior Being or beings in whose existence and power he believes, implies an operation of the will and an execution of its resolution, whether or not amounting to a fulfilment of its purpose. It implies a procedure from cause to result. Action must therefore present itself to the human mind as having its source in a human or superhuman will. Every imitation of action by action is in germ a drama. But to this point not all nations have advanced

After this step has been taken, it only remains for the drama to assume a form regulated by literature, of which art it thus becomes a branch. We may then speak of a dramatic literature; but this only a limited number of nations has come to possess. A nation may, however, have a drama without a dramatic literature; it may even continue in possession of the former after having ceased to cultivate the latter. On the other hand, both before and after the drama of a nation has assumed a literary form, it may allow one or more of its adventitious elements—music, dancing, decoration—predominantly to assert themselves, and thus eventually to bring about the formation of new, or the revival of disused, dramatic species. But as a branch of literature the drama necessarily includes speech among its means of imitation; and its beginnings as such are accordingly, in the history of all literatures known to us, preceded by the beginnings at least of other forms of poetic composition, the lyric and the epic, or by those of one of these forms at all events. It is in the combination of both that the drama in its literary form takes its origin in the case of all national civilizations in which it has found a place and with which we are more than superficially acquainted.

The art of acting is the indispensable adjunct of the dramatic art, while the aid of all other arts is merely an accident. But though really inseparable from one another, the courses of the dramatic and the histrionic arts do not at all times run parallel. The actor is only the temporary interpreter of the dramatist, though he may occasionally be left to supply some of the proper functions of his text-giver. On his side, the dramatist may in practice, though he cannot in theory, dispense with the actor's interpretation; but though the term literary drama is sometimes used of works kept apart from the stage, it is in truth a misnomer, since, properly speaking, no drama is such till it is acted.

The whole body of the laws and rules of the drama, could it be written down with completeness, would indicate, together with the ends proper to the art, the means by which it is able to accomplish them. But neither the great authorities of dramatic theory—an Aristotle or a Lessing—nor the resolute apologists of more or less transitory fashions—a Corneille or a Dryden—have exhausted the exposition of the means which the drama has proved or may prove capable of employing. The multitude of technical terms and formulæ which has gathered round the practice of the art has at no time seriously interfered with the operation of creative power, whose inventive activity the existence of, accepted systems has frequently—in the Greek drama, for instance, and in the Spanish—served to stimulate. On the other hand, it is self-evident that no dramaturgic theory has ever given rise to a single dramatic work of enduring value, unless the creative force was there to animate the form.

The task of this creative force begins with the beginnings of the dramatist's labours. For it is in the dramatic *idea* that the germ of the action of a play lies—not in the *subject*, which is merely its dead material. The story of the Scottish thane as it stood written in the chronicle, is the subject, not the action, of *Macbeth*. To convert a subject—whatever its kind or source—into the action or fable of a play is the primary task, which in its progressive development becomes the entire task, of the dramatist; and though the conception may expand or modify itself with the execution, yet upon the former the latter depends. The range of subjects open to a dramatist may be wide as the world itself, or it may be limited by usage, by imperious fashion, by the tastes and tendencies of a nation or an age, by the author's own range of sympathies, by a thousand restrictions of an historical, moral, or æsthetical origin; it may be virtually confined (as with the earlier Greek tragedians) to a body of legend, or (as with the English comedians of the Restoration) to the social experiences of a particular epoch. But in all cases the transformation of the subject into the action is equally indispensable; and an imperfect transformation is (as in the old Chronicle Histories) the work of a rude, or (as in ninety-nine out of a hundred modern plays "founded upon fact") that of a careless method of dramatic production.

Unity of action.

What, then, are the laws which determine the nature of all actions properly such, however they may vary either in subjects or in form? In the first place, a dramatic action must possess *unity*—and this requirement at once distinguishes it from the subject which has suggested its idea. The events of real life, the facts of history, the incidents of narrative fiction, are like the waves of a ceaseless flood; that which binds a group or body of them into a single action is the bond of the dramatic idea, and this it is which the dramatist has to supply. Within the limits of a dramatic action all its parts claim to be connected together as contributions to a single stream; and upon the degree in which they are true to this purpose their primary dramatic significance depends. The unity of action which a drama should possess, therefore, means that everything in it should form a link in a single chain of cause and effect. This law is incumbent upon every kind of drama—alike upon the tragedy which solves the problems of a life,