After the tooth has become sacculated, and coincident with the transformation of the odontoblast cells of the dental papilla into dentine, calcification begins in the elongated prismatic cells of the internal or enamel epithelium; their protoplasm becomes calcified,

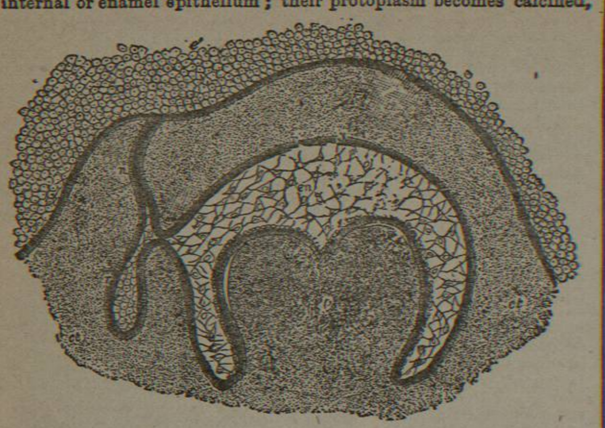


FIG. 21.—Vertical section through the gum in the region of the molar teeth. *p*, the papilla of a milk molar; 1, the inner, 2, the middle, and 3, the outer layers of the enamel organ; *n*, the neck of the enamel organ; *e′*, the superficial epithelium; *ct*, *ct*, *ct*, the sub-epithelial connective tissue which subsequently forms the sac of the tooth; *r*, the cavity of reserve occupied by epithelium, in connection with which the permanent successional tooth is formed. × 300.

and they become the rods or prisms of the enamel. As the hardening takes place from the periphery to the centre of each cell, the axial portion may, as Tomes pointed out, remain soft for some time in the axis of the enamel rod. With the increase in length, and with the calcification of the cells of the enamel epithelium, the stellate gelatinous cells disappear, and the outer ends of the enamel rods come in contact with the cells of the external enamel epithelium. By some observers the external epithelium is supposed to disappear without undergoing any special differentiation, but by others it is believed to undergo conversion into Nasmyth's membrane.

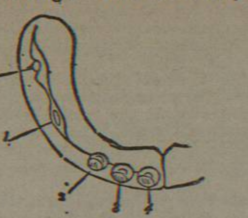
In this manner the crown of a tooth is formed, and it is lodged in a membranous sac formed by the differentiation into a fibro-vascular membrane of the surrounding connective tissue. Whilst within its sac, the crown of the tooth possesses the characteristic form of the group of teeth to which it belongs. After the calcification of the enamel rods is completed, it can undergo no further change either in shape or in increase of size.

Whilst the crown of the tooth is being formed, ossification of the jaws has been going on, and the tooth, with its membranous sac, has become lodged in an alveolus or socket in the jaw, which alveolus is closed in by the gum.

In order that the crown of the tooth may come into use as a masticatory organ, it has to be elevated to the level of the gum, which is absorbed by the pressure, and the crown then erupts into the cavity of the mouth. The process of eruption is due to the development of the fang, which, as it grows in length, elevates the crown of the tooth and forces it outward. The dentine of the fang is developed from the odontoblast cells of the pulp in a manner similar to that already described for the development of the dentine of the crown. The cement or crusta petrosa is developed from the connective tissue lining the alveolus, which forms the alveolo-dental periosteum. It is therefore an ossification in membrane.

As the temporary or milk teeth precede the permanent teeth, their papillæ are naturally the first to form. The series of milk-papillæ are not, however, simultaneously produced. From the observations of Goodsir, it has been shown that the milk-papilla of the anterior molar in the upper jaw appears about the seventh week; then the canine papilla, the two incisor papillæ, and the posterior molar papilla are sucessively formed, the last making its appearance about the end of the tenth week. The dental papillæ in the upper jaw immediately precede the papillæ of the corresponding teeth in the lower jaw.

The eruption of the milk teeth into the mouth does not begin to take place until the latter half of the first year of extra-uterine life, and is not completed until betweeen the second and third year. Though variations occur in the date of eruption of each tooth in different children, it may be stated that the incisors usually appear from the seventh to the ninth month, the anterior molars from the twelfth to the sixteenth month, the canines during the seventeenth or eighteenth month, the posterior milk molars from two to two and a half years. The milk teeth begin to be shed about the sixth year by the dropping out of the incisors. The last to be shed are the canines, which do not fall out till the tenth or eleventh year. The shedding of the milk teeth is preceded by the absorption of the fangs. This is effected, as was satisfactorily shown by J.



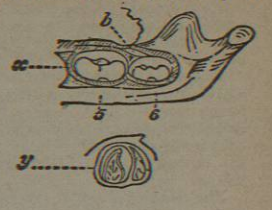


FIG. 22.—One-half the lower jaw of a fœtus about the 11th or 12th week, showing the dental papillæ in the order of their appearance. 1, the first milk molar; 2, the canine; 3 and 4, the two incisors; 5, the second milk molar.—From Goodsir.

FIG. 23.—Posterior part of the lower jaw of a child at birth. 5, the crown and sac of the posterior milk molar; 6, the crown and sac of the first permanent molar; *b*, the cavity in connection with which the papilla of the second permanent molar ultimately forms. *y*, shows a temporary and permanent incisor from the same fœtus.—From Goodsir.

Tomes, by the agency of a group of cells situated at the bottom of the sockets. As these cells occasion absorption of the tooth tissue, similar to that occurring in the bone tissue from the action of the large multi-nucleated osteo-klast cells, they may appropriately be called *odonto-klasts*.

The development of the *permanent teeth* will now be considered. In the description of the arrangement of the teeth it has been pointed out that the number of teeth in the permanent set exceeds that of the temporary set. The permanent incisors and canines come into the place of the temporary incisors and canines, and the permanent bicuspids succeed the temporary molars, but the permanent molars have no milk predecessors, and are superadded at the back of the dental series.

The development of the *successional permanent teeth*, which are the ten anterior teeth in each jaw, will first be examined. Prior to the period when the lips of the primitive dental groove meet, to produce the saccular stage of dentition of the several temporary teeth, an indentation, or furrow, takes place in the connective tissue adjoining the string of epithelial cells which form the neck of the enamel organ. This furrow constitutes what Goodsir termed the *cavity of reserve*, and it is filled up by epithelial cells continuous with the epithelium of the neck of the enamol organ. As a cavity of reserve is formed immediately behind (*i.e.*, on the lingual side of) each milk tooth, they are ten in number in each jaw, and, except that for the anterior molar, are formed successively from before backwards.

The cavities of reserve are concerned in the production of the permanent successional teeth, and each temporary tooth is replaced by the permanent tooth formed in connection with the cavity of reserve situated immediately behind it (fig 21). The cavities of reserve become elongated, and widened, and pass above the temporary teeth in the upper jaw, and below those in the lower jaw. At the bottom of each a dental papilla forms, the apex of which indentates and becomes covered by the epithelium contained in the cavity, which forms a cap for the papilla, and constitutes the enamel organ for the permanent tooth. The cavity becomes completely closed by the growth of the surrounding connective tissue, and the embryo permanent tooth becomes sacculated. The process of calcification then goes on, in both the enamel organ and dental papilla, in a manner similar to that already described in the temporary teeth. The permanent teeth then become lodged in sockets in the jaw distinct from those of the temporary teeth. The sac of each permanent tooth remains connected with the fibrous tissue of the gum by a slender fibrous band, or *gubernaculum*, which passes through a hole in the jaw immediately behind the corresponding milk tooth. Before the successional permanent tooth erupts, not only should the temporary tooth be shed, but the bony partition between their respective sockets must be absorbed.

The *superadded permanent teeth*, or permanent molars, three in number on each side, lie behind the successional teeth. Their mode of origin is similar to that of the temporary teeth. The primitive groove, occupied by an involution of the epithelial covering of the gum, is prolonged backwards. Three dental papillæ successively appear at the bottom of this groove, and the epithelium covering each papilla forms its enamel organ. Legros and Magitot, however, state that the second permanent molar arises in connection with a diverticulum (cavity of reserve) proceeding from the epithelial string of the enamel organ of the first permanent molar, and that the wisdom tooth is formed in connection with a similar diverticulum from the second permanent molar. The embryo tooth becomes sacculated, and goes through the process of calcification similar to what has been described in the other teeth

The germ of the first permanent molar appears about the sixteenth week of embryo life; that of the second permanent molar not until about the seventh month after birth; whilst that of the wisdom tooth is not formed until about the sixth year The crown of the

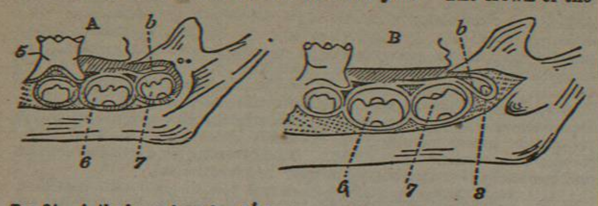


FIG. 24.—A, the lower jaw of a child between four and five years old. 5, the last milk molar, with the successional bicuspid tooth in the cavity of reserve immediately below it; 6 and 7, the first and second permanent molars in their sacs; *b*, the cavity in connection with which the wisdom tooth is formed. B, the lower jaw of a child about six years old; 6 and 7, the first and second permanent molars; 8, the papilla of the wisdom tooth developed in connection with its cavity *b*.—From Goodsir

first molar is the first of the permanent teeth to erupt into the mouth, which it usually does in the sixth year. The incisors appear when the child is seven or eight; the bicuspids when it is nine or ten; the canines about twelve; the second molars about thirteen; and the wisdom teeth from seventeen to twenty five.

In his dentition man is diphyodont as regards his incisor, canine, and premolar teeth, but monophyodont in the molar series.

From the description of the development of the teeth, it will have been seen that a tooth is made up of three hard tissues—enamel, dentine, and cement—and of the soft vascular and nervous pulp. These tissues are not developed from one layer only of the blastoderm. The enamel is of epiblast origin, whilst the dentine, cement, and pulp are derived from the mesoblast. A tooth in its fundamental development, as was long ago pointed out by Goodsir, must be referred to the same class of organs as the hairs and feathers. The enamel of the tooth, like the hair, is produced by a differentiation of the involuted epithelium of the epiblast, whilst the dentine and pulp resemble the papilla of the hair, in proceeding from the mesoblast. The tooth-sac, like the hair-follicle, is also of mesoblast origin. Whether the cement, as Robin and Magitot have described, be developed by means of a special *cement organ*, in the interior of the tooth-sac, or be formed, as has been stated in this description, by the alveolo-dental periosteum, it is on either view derived from the mesoblast. As to the origin of Nasmyth's membrane, there is a difference of opinion; some regard it as a special cornification of the external cells of the enamel organ, in which case it would be from the epiblast; whilst others consider it to be continuous with though structurally different from, the cement—homologous, therefore, with the layer of cement, which in the horse, ruminants, and some other mammals covers the surface of the crowns of the teeth.

The tissues of a tooth have not all the same importance in the structure of a tooth. The dentine is apparently always present, but the enamel, or the enamel and cement, may be absent in the teeth of some animals. For example, the tusks of the elephant and narwhal, and the teeth of the Edentata, are without enamel, and in the Rodentia enamel is present on only the anterior surface of the incisors. But though the enamel is not developed, or forms only an imperfect covering for the crowns of these teeth, yet an enamel organ is formed in the embryo jaws. In 1872 W. Turner described a structure homologous with the enamel organ in relation with each of the dental papillæ in the lower jaw of a fœtal narwhal; but this organ did not exhibit a differentiation into the three epithelial layers, such as occurs in those teeth in which enamel is developed. Since then C. S. Tomes has seen an enamel organ in the embryo armadillo, and has also pointed out that, in teeth generally, enamel organs exist, quite irrespective of whether enamel subsequently does or does not form.

But further, the involution of the oral epithelium, and the coincident formation of a primitive groove, take place not only where the teeth subsequently arise, but along the whole curvature of the future jaws; whilst the production of dental papillæ is restricted to the spots where the teeth are formed. Hence it would seem that the inflection of the oral epithelium is not so essential to the development of a tooth as the formation of a papilla. The inflected epithelium marks only a preliminary stage, and it may or may not be transformed into tooth structure. But that which is essential to the formation of a tooth is the production of the papilla which appears at the bottom of the primitive groove. (W. T.)

DIGITALIS, or FOXGLOVE, a genus of biennial and perennial plants of the natural order *Scrophulariaceæ*. The common or purple foxglove, *D. purpurea*, is common in dry hilly pastures and rocky places and by road sides in various parts of Europe; it ranges in Great Britain from Cornwall and Kent to Orkney, but it does not occur in Shetland or in some of the eastern counties of England. It flourishes best in siliceous soils, and is not found in the Jura and Swiss Alps. The characters of the plant are as follows:—stem erect, roundish, downy, leafy below, and from 18 inches to 6 feet or more in height; leaves alternate, crenate, rugose, ovate or elliptic-oblong, and of a dull green, with the under surface downy and paler than the upper; radical leaves together with their petioles often a foot in length; root of numerous, slender, whitish fibres; flowers $1\frac{3}{4}$–$2\frac{1}{2}$ inches long, pendulous, on one side of the stem, purplish crimson, and hairy and marked with eye-like spots within; segments of calyx ovate, acute, cleft to the base; corolla obtuse, with the upper lobe entire or obscurely divided; stamens four and didynamous (see vol. iv. p. 138, fig. 226); anthers yellow and bilobed; capsule bivalved, ovate, and pointed; and seeds numerous, small, oblong, pitted, and of a pale brown. As Parkinson remarks of the plant, "It flowreth seldome before July, and the seed is ripe in August;" but it may occasionally be found in blossom as late as September. In one variety, common in gardens, the flowers are white; in another their purple is of a coppery or metallic hue; and not unfrequently in cultivated plants several of the uppermost blossoms may be united together so as to form a cup-shaped compound flower, through the centre of which the upper part of the stem passes. A figure of *D. purpurea* will be found in vol. iv. plate xi. Many species of foxglove with variously-coloured flowers have been introduced into Britain from the Continent. The plants may be propagated by off-sets from the roots, but are best raised from seed.

The foxglove (Ang.-Sax., *foxes-clife*, *foxes-glofa*) is known by a great variety of popular names in Britain. In the south of Scotland it is called bloody fingers; further north, dead-men's-bells; and on the eastern borders, ladies' thimbles, wild mercury, and Scotch mercury. Among its Welsh synonyms are *menyg-ellyllon* (elves' gloves), *menyg y llwynog* (fox's gloves), *bysedd cochion* (red fingers), and *bysedd y cwn* (dog's fingers). In France its designations are *gants de notre dame*, and *doigts de la Vièrge*. The German name *fingerhut* (thimble) suggested to Fuchs, in 1542, the employment of the Latin adjective *digitalis* as a designation for the plant.

The leaves, gathered from wild plants when about two-thirds of their flowers are expanded, deprived usually of the petiole and the thicker part of the midrib, and dried, constitute the drug *digitalis* or *digitalis folia* of the pharmacopœia. The prepared leaves have a faint odour and bitter taste; to preserve their properties they must be kept excluded from light in stoppered bottles. They are occasionally adulterated with the leaves of *Inula Conyza*, Ploughman's Spikenard, which may be distinguished by their greater roughness, their less divided margins, and their odour when rubbed; also with the leaves of *Symphytum officinale*, Comfrey, and of *Verbascum Thapsus*, Great Mullein, which unlike those of the foxglove have woolly upper and under surfaces. The powder, infusion, and tincture of digitalis are employed both externally and internally; and its active principle, *digitalin*, may further be used for subcutaneous injection. Digitalin, according to Nativelle, is a crystallizable, neutral, inodorous, bitter substance, of the formula $C_{25}H_{40}O_{15}$, insoluble in water and ether, but soluble in alcohol and chloroform. The earliest known descriptions of the foxglove are those given by Fuchs and Tragus about the middle of the 16th century, but its virtues were doubtless known to herbalists at a much remoter period. Gerarde, in his *Herbal* (1597), advocates the use of foxglove for a variety of complaints; and John Parkinson, in the *Theatrum Botanicum*, or *Theater of Plants* (1640), tells us that

"The Italians have an usuall proverbe with them concerning this herb, called by them *Aralda*, which is *Aralda tutte piaghe salda*: *Aralda* salveth all sores . . . . . It hath been found by late experience to be availeable for the King's Evill . . . . also to be effectuall against the Falling Sicknesse, that divers have been cured thereby." Later, Salmon, in *The New London Dispensatory*, praises the remedy foxglove in no measured terms.

Digitalis was first brought prominently under the notice of the medical profession by Dr W. Withering, who, in his *Account of the Foxglove* (1785), gave details of upwards of 200 cases, chiefly dropsical, in which it was used. Having become acquainted with the drug in 1775 as an ingredient in a Shropshire family receipt for the cure of dropsy, he began to administer it as a diuretic, but at first in doses too large; for, "misled by reasoning from the effect of the squills, which generally acts best upon the kidneys when it excites nausea," he sought to produce the same effect by foxglove. Further experience, however, convinced him "that its diuretic effects do not at all depend upon its exciting nausea or vomiting;" and that often the urinary discharge may be checked when the dose is imprudently urged so as to occasion sickness. He moreover observed that in cases where the drug produced purging it was inefficacious unless combined with small doses of opium, so as to restrain its action on the bowels. Withering seldom found it to succeed in men of great natural strength, tense fibre, warm skin, and florid complexion, or in those with a tight and cordy pulse. He recommended digitalis "in every species of dropsy, except the encysted;" and he was of opinion that it might be made subservient to the cure of diseases unconnected with dropsy, and that its power over the motion of the heart, to a degree unobserved by him in any other medicine, might be turned to good account by the physician.

The experiments of Marcet and Brunton show that the infusion of digitalis has a poisonous effect on various plants, and, even in very small quantity, kills fishes,—their auricles after death being found distended, their ventricles strongly contracted. On birds the effect of the infusion is to cause firm contraction of the left ventricle, and consequent excessive congestion of the lungs. A large turkey, according to M. Salerne (*Hist. de l'Académie*, 1748, p. 120, 12mo, and p. 84, 4to ed.), walked as if intoxicated, in consequence of partaking once of foxglove leaves. Another turkey, weighing 7 lb, ate during 4 days about half a handful of the leaves, after which it refused nourishment, and in a couple of weeks died, its weight being reduced to 3 lb. Handfield Jones and Fuller have proved that the infusion produces upon the hearts of frogs and mammals effects similar to those observed in birds. The usual results of small and repeated doses of digitalis are contraction of the capillaries, and augmented arterial blood-pressure, with slower and more powerful cardiac systole, and an increase in the urinary secretions; large or long-continued doses, besides causing nausea or vomiting, often accompanied by purging, occasion a slow or irregular pulse, dilatation of the capillaries, decrease in the rate of respiration, cold sweats, disordered vision, chilliness of the extremities, giddiness, and great weakness, followed by convulsions and insensibility. Syncope is apt to occur on sudden changes of posture by patients fully under the influence of the drug. Its cumulative action, or unexpected production of alarmingly acute symptoms, may arise either from an increase in the dose, the elimination of the drug being constant, or from a check in the elimination, the dose remaining unaltered, hence the caution with which digitalis should be administered in cases where the renal functions are disturbed. The experiments of various physiologists have shown that digitalis, by stimulating the sympathetic ganglia of the heart, causes the contraction of its musculo-motor fibres, this effect being at first masked by a similar action on the pneumogastric nerves. By effecting more complete emptying of the ventricles in cases of cardiac disturbance, digitalis improves the circulation, bringing about in the lungs a more thorough oxidation of the blood. The consequent increased nutrition of the heart is promotive of hypertrophy in that organ; small doses of digitalis are therefore an assistance in hypertrophy following upon cardiac injury. In cases of dilatation of the heart, on the other hand, large doses are required. The continued use of the drug when the heart has become sufficiently hypertrophied may render ventricular action excessive. Digitalis calms excitement of the heart not by acting as a narcotic or sedative but by stimulating its nerves, and enabling it to contract without laboured effort. In feeble conditions of the circulation it acts diuretically by increasing arterial tension, but its influence as a diuretic is not constant. Its efficacy in epilepsy appears to be limited by its action on the circulation. In enteric fever, erysipelas, and acute rheumatism, it has been employed to reduce temperature. Its use as a sedative in pneumonia, delirium tremens, and some other diseases has been objected to on the ground that it cuts off the irritating blood supply only by an extreme degree of ventricular contraction. In arachnitis in children, in inflammation tending towards serous effusion, in dropsy, hæmorrhage, cerebral anæmia, and occasionally in angina pectoris and nervous palpitation, it is a valuable remedy. Upon the uterus digitalis acts by stimulating the ganglia in which its motor power resides (W. Howship Dickenson, in *Med. Chir. Trans.* vol. xxxix. Lond. 1865). In poisoning by digitalis, aconite and probably also Calabar bean may be resorted to.

A. L. J. Bayle, *Bibliotheque de Therapeutique*, tom. iii. pp. 1–372; Christison, *A Treatise on Poisons*, p. 886, 4th ed. 1855; Sir H. Holland, *Medical Notes and Reflections*, chap. xxix. 3d ed., 1855; Trousseau et Pidoux, *Traité de Therapeutique*, vol. ii. p. 754, 1862; T. L. Brunton, *On Digitalis*, 1868; J. Milner Fothergill, *Digitalis, its Mode of Action, and its Use*, 1871; Pereira, *Materia Medica*, 1874; Garrod, *Materia Medica*, 1874; G. W. Balfour, *Clinical Lectures on the Diseases of the Heart and Aorta*, pp. 97 and 304, 1876. (F. H. B.)

DIGNE, the chief town of the department of Basses-Alpes, in France, about 70 miles north-east of Marseilles, in 44° 5′ 32″ N. lat. and 6° 14′ 6″ E. long. It is built on a spur of the mountains jutting out into a gorge traversed by the Bléonne, which in winter is a formidable torrent, but in summer is almost dry; and the neighbourhood is rich in orchards, which have long made the town famous in France for its preserved fruits and confections. The streets are narrow and tortuous, with the exception of the Boulevard Gassendi, at the upper end of which is a public garden, with a statue of the philosopher, who was born in the neighbouring village of Chantercier. The cathedral within the town is a building of very hybrid architecture, and is of less importance than the cathedral of Notre Dame, in the vicinity, which dates from the 12th century, and is numbered among the historic monuments of France. The thermal springs are not in much repute, and the bathing establishment is in a state of decay. Digne is identified with Dinia, the capital of the Avantici and Bodiontici. It early became an ecclesiastical see, and its bishops acquired the secular rank of barons of Lauzières. In the 16th century it suffered on four separate occasions from the Huguenot soldiery; and in modern history it is known as the place from which Napoleon issued his proclamation of March 1815. Population in 1872, 5300 in the town and 6877 in the commune.

DIJON (*Divio*, *Dibio*, or *Divionense Castrum*), the chief town of the department of Côte-d'Or in France, and formerly capital of the province of Burgundy, is situated at the foot of Mount Affrique, in a fertile plain, on the Burgundy canal, and at the confluence of the Ouche and Suzon, in 47° 19′ 19″ N. lat., and 5° 2′ 5″ E. long. The streets are broad and well built of freestone, and there are fifteen squares; an abundant supply of water is obtained from the vale of Suzon by means of a subterranean aqueduct nearly eight miles in length. Among the more noteworthy of the public edifices are the cathedral of St Bénigne, in the Gothic style of the 13th century, with a spire erected in 1742; the church of Notre Dame built in 1331–1445, containing a group in stone, the Assumption of the Virgin, by Dubois, and a statue of the Black Virgin, celebrated in the Middle Ages; the church of St Michel, of the 16th century; the general hospital, founded by Otho III. in 1206; the castle, commenced in 1478 by Louis XI., and finished in 1512 by Louis XII., once a state prison, in which the duchess of Maine, Mirabeau, the Chevalier d'Eon, and Toussaint Louverture were confined, and since then a barrack for gendarmes; and the old palace of the dukes of Burgundy, or hôtel de ville, rebuilt between the end of the 17th and the end of the 18th century, in which are an art collection, the archives, a museum of natural history, a school of arts, and the salle des gardes, containing the tombs of Philippe le Hardi and Jean sans Peur. Important structures also are the lunatic asylum, the ancient court-house, the theatre, and the hospice Saint-Anne, and numerous other educational establishments. Dijon possesses a library of 70,000 volumes and 900 manuscripts, a picture gallery, a collection of coins and of 40,000 engravings, a jardin des plantes and herbarium, and a fine park, commenced in 1670, after the designs of Le Nôtre, by the Great Condé, and finished by his son. It is the seat of a bishop, and of tribunals of primary instance and

Plan of Dijon.

1 Statue of St Bernard.
2. Prefecture.
3. Notre Dame.
4. Post Office.
5. Hôtel de Ville.
6. St Michel.
7. Theatre.
8. Cathedral of St Bénigne.
9. Palace of Justice.

commerce, and has faculties of law, science, and literature. The ramparts that formerly surrounded the town have been replaced by broad avenues. The principal industries are the manufacture of hosiery, woollen and cotton cloth, Paris lace, leather, candles, earthenware, mustard, confections, vinegar, and chemicals; iron and type-founding, printing and binding, brewing, saltpetre-refining, and nursery-gardening. Dijon does an important trade in cereals, and is the chief emporium for Burgundy wines. The population of the commune in 1872 was 42,573; that of the town, 40,116.

Dijon was a fortified camp of the Romans, and about 274 was enlarged by Aurelian. In 731 it was taken and burnt by the Saracens. Councils were held there in 1077, 1116, and 1199 or 1200. Early in the 12th century the town was almost entirely destroyed by fire, but it was soon rebuilt. Till 1107 it was held by the counts of Dijon, and from 1179 to the death of Charles the Bold in 1477 it was the residence of the dukes of Burgundy; it then came into the possession of Louis XI., who established there the Burgundian "*Parlement*." In 1513 Dijon was besieged by 20,000 Swiss, with whom a humiliating treaty was concluded. On October 31, 1870, the town capitulated to General Werder; it was evacuated by the Germans on the 27th of December, and early in January 1871 became the head-quarters of the French eastern army under Bourbaki. On the 1st of the following February it was re-occupied by the Germans. Dijon is the birthplace of Bossuet, Jacques Cazotte, the elder Crébillon, Daubenton, Jouffroy, Longpierre, Bernard de la Monnoie, Guyton de Morveau, Piron, Rameau, and Saumaise.

DILAPIDATIONS, in English law, is the name given to the waste committed by the incumbent of an ecclesiastical living. By the general law a tenant for life has no power to cut down timber, destroy buildings, &c. (voluntary waste), or to let buildings fall into disrepair (permissive waste). In the eye of the law an incumbent is a tenant for life of his benefice, and any waste, voluntary or permissive, on his part must be made good by his administrators to his successor in office. The principles on which such dilapidations are to be ascertained, and the application of the money payable in respect thereof, depend partly on old ecclesiastical law and partly on recent Acts of Parliament. Questions as to dilapidations usually arise in respect of the residence house and other buildings belonging to the living. Inclosures, hedges, ditches, and the like are included in things "of which the beneficed person hath the burden and charge of reparation." In a leading case (Ross *v.* Adcock, 37 *Law Journal*, C.P. 290) it was said that the court was acquainted with no precedent or decision extending the liability of the executors of a deceased incumbent to any species of waste beyond dilapidation of the house, chancel, or other buildings or fences of the benefice. And it has been held that the mere mismanagement or miscultivation of the ecclesiastical lands will not give rise to an action for dilapidations. To place the law relating to dilapidations on a more satisfactory footing, the Act 34 and 35 Vict. c. 43 was passed. The buildings to which the Act applies are defined to be such houses of residence, chancels, walls, fences, and other buildings and things as the incumbent of the benefice is by law and custom bound to maintain in repair. In each diocese a surveyor is to be appointed by the archdeacons and rural deans subject to the approval of the bishop; and such surveyor shall by the direction of the bishop examine the buildings on the following occasions—viz., 1, when the benefice is sequestrated; 2, when it is vacant; 3, at the request of the incumbent or on complaint by the archdeacon, rural dean, or patron. The surveyor is to specify the works required, and to give an estimate of their probable cost. In the case of a vacant benefice, the new incumbent and the old incumbent or his representatives may lodge objections to the surveyor's report on any grounds of fact or law, and the bishop, after consideration, may make an order for the repairs and their cost, for which the late incumbent or his representatives are liable. The sum so stated shall be a debt due from the late incumbent or his representatives to the new incumbent, who shall pay over the money when recovered to the governors of Queen Anne's Bounty. The governors pay for the works on execution on receipt of a certificate from the surveyor; and the surveyor, when the works have been completed to his satisfaction, shall give a certificate to that effect, the effect of which, so far as regards the incumbent, will be to protect him from liability for dilapidations for the next five years. Unnecessary buildings belonging to a residence house may, by the authority of the bishop and with the consent of the patron, be removed. An amending statute (35 and 36 Vict. c. 96) relates chiefly to advances by the governors of Queen Anne's Bounty for the purposes of the Act.

DILIGENCE, in law, is the care which a person is bound to exercise in his relations with others. The possible degrees of diligence are of course numerous, and the same degree is not required in all cases. Thus a mere depositary would not be held bound to the same degree of diligence as a person borrowing an article for his own use and benefit. Jurists, following the divisions of the civil law, have concurred in fixing three approximate standards of diligence—viz., ordinary, less than ordinary, and more than ordinary. Ordinary or common diligence is defined by Story (*On Bailments*) as "that degree of diligence which men in general exert in respect of their own concerns." So Sir William Jones:—"This care, which every person of common prudence and capable of governing a family takes of his own concerns, is a proper measure of that which would uniformly be required in performing every contract, if there were not strong reasons for exacting in some of them a greater and permitting in others a less degree of attention" (*Essay on Bailments*). The highest degree of diligence would be that which only very prudent persons bestow on their own concerns; the lowest, that which even careless persons bestow on their own concerns. The want of these various degrees of diligence is negligence in corresponding degrees. These approximations indicate roughly the greater or less severity with which the law will judge the performance of different classes of contracts; but English judges have been inclined to repudiate the distinction as a useless refinement of the jurists. Thus Baron Rolfe could see no difference between negligence and gross negligence; it was the same thing with the addition of a vituperative epithet. See NEGLIGENCE.

Diligence, in Scots law, is a general term for the process by which persons, lands, or effects are attached on execution, or in security for debt.

DILKE, SIR CHARLES WENTWORTH (1810–1869), Baronet, born in London, February 18, 1810, was the only son of Charles Wentworth Dilke, proprietor and editor of the *Athenæum*, and was educated at Westminster school and Trinity Hall, Cambridge. He studied law, and in 1834 took his degree of LL.B.; but he did not enter upon the practice of his profession. He assisted his father in his literary work, and afterwards gave up much of his time to several of the learned societies. He was for some years chairman of the council of the Society of Arts, and took a prominent part in the affairs of the Royal Horticultural Society. He was one of the most zealous promoters of the Great Exhibition (1851), and a member of the executive committee. At the close of the exhibition he was honoured by foreign sovereigns, and the Queen offered him knighthood, which, however, he did not accept; he also declined a large remuneration offered by the royal commission. In 1853 Dilke was one of the English Commissioners at the New York Industrial Exhibition, and prepared a report on it He again declined to receive any money reward for his services. He was appointed one of the five royal commissioners for the Great Exhibition of 1862; and soon after the death of the Prince Consort he was created baronet by the Queen. In 1865 he entered parliament as member for Wallingford. In 1869 he was sent to Russia as representative of England at the Horticultural Exhibition held at St Petersburg. His health, however, had been for some time failing, and he died suddenly in that city, May 10, 1869. He was a fellow of the Society of Antiquaries, and a member of other learned bodies.

DILL (*Anethum*), a genus of umbelliferous plants having decompound leaves; umbels without involucre; yellow flowers, with calices incomplete above; and lenticular fruit, compressed from back to front, flattened at the margin, and presenting on each side three ridges. The common species, *A. graveolens*, is indigenous to the south of Europe, Egypt, and the Cape of Good Hope. It resembles fennel in appearance. Its root is long and fusiform; the stem is round, jointed, and about a yard high; the leaves have fragrant folioles; and the fruits are brown, oval, and concavo-convex. The plant flowers from June till August in England. The seeds are sown, preferably as soon as ripe, either broadcast or in drills between 6 and 12 inches asunder. The young plants should be thinned when three or four weeks old, so as to be at distances of about 10 inches. A sheltered spot and dry soil are needed for the production of the seed in the climate of England. The leaves of the dill are used in soups and sauces, and, as well as the umbels, for flavouring pickles. The seeds are employed for the preparation of dill-water and oil of dill (valued for their carminative properties), are largely consumed in the manufacture of gin, and, when ground, are eaten as a condiment in the East. See BOTANY, vol. iv. p. 123.

DILLEN [DILLENIUS], JOHANN JAKOB (1687–1747), a distinguished botanist, was born at Darmstadt. He was educated at the university of Giessen, where he received his doctor's diploma, but he early turned his attention from medicine to the study of plants. Whilst at Giessen he wrote several botanical papers for the *Ephemerides Naturæ Curiosorum*, and in 1719 he printed there his *Catalogus Plantarum sponte circa Gissam nascentium*, a little octavo volume illustrated with figures drawn and engraved by his own hand, and containing descriptions of many new genera. In the preface he discusses the classifications of Rivinus, Tournefort, Knaut, and Ray, the last of which was that adopted by him. In 1718 Dillen became acquainted in Germany with the botanist William Sherard, who invited him to come to England. Soon after his arrival there, in 1721, he took up his abode at Oxford, where Sherard resided. In 1724 he published an enlarged edition of Ray's *Synopsis Stirpium Britannicarum*. In accordance with the will of Sherard, who died in 1728, Dillen was appointed professor of botany at Oxford. He published in 1732, in two volumes folio, with 324 plates executed by himself, the *Hortus Elthamensis*, of which Linnæus wrote—"Est opus botanicum quo absolutius mundus non vidit." That naturalist spent a month with Dillen at Oxford in 1736, and afterwards dedicated to him his *Critica Botanica*. In 1741 appeared the *Historia Muscorum* of Dillen, to whom and his contemporary Micheli (1679–1731) cryptogamic botany owes its origin. He died April 2, 1747, in his sixtieth year. A print from his picture at Oxford is to be seen in Sim and König's *Annals of Botany*, vol. ii. His books and collection of mosses, with many drawings, were bought by his successor at Oxford, Dr Humphrey Sibthorp, and added to the Sherardian Museum.

DILLINGEN, a town of Bavaria, in the circle of Schwaben-Neuburg, on the left bank of the Danube, 24 miles north-west of Augsburg. Its principal structures are the royal palace, formerly the residence of the bishops of Augsburg, the royal gymnasium and Latin school, with a library of 75,000 volumes, five churches, two episcopal seminaries, a Capuchin monastery, a Franciscan nunnery, and a deaf and dumb asylum. The university, founded in 1549, was abolished in 1804, being converted into a lyceum. The inhabitants, who in 1875 numbered 5029, are engaged in cattle-rearing, the cultivation of corn, hops, and fruit, ship-building and the shipping trade, and the manufacture of cloth, paper, and cutlery. Dillingen was taken by the Swedes in 1632 and 1648, by the Austrians in 1702, and on the 18th July 1800 by the French.

DIMENSIONS. In geometry a line is said to be of one dimension, a surface of two, and a solid of three dimensions. The use of the word is extended to algebraical terms, which are said to be of n dimensions with respect to any quantity when that quantity enters to the nth power.

If the term contains several variables, x, y, z, &c., and if the sum of the indices of these variables is n, the term is said to be of n dimensions with respect to the system of variables x, y, z.

If all the terms of an equation are of n dimensions with respect to the system of variables x, y, z, the equation is said to be homogeneous of n dimensions with respect to that system of variables.

The equation may or may not be homogeneous with respect to another system of variables which occur in it, as p, q, r.

If all the variables of a system with respect to which the equation is homogeneous are increased in the same ratio, the equation will still be true.

The general equations occurring in the application of mathematics to natural phenomena are equally true whatever units we employ for the measurement of the different quantities which enter into them, provided we employ the same units throughout the equation. Hence such equations must be homogeneous with respect to any system of variables which is referred to the same unit, and all quantities essentially numerical, such as exponents and exponentials, logarithms, angles, and circular and elliptic functions, must be of zero dimensions.

There are two methods of interpreting the equations relating to geometry and other concrete sciences.

We may regard the symbols which occur in the equation as of themselves denoting lines, masses, times, &c.; or we may consider each symbol as denoting only the numerical value of the corresponding quantity, the concrete unit to which it is referred being tacitly understood.

If we adopt the first method we shall often have difficulty in interpreting terms which make their appearance during the calculations. We shall therefore consider all the written symbols as mere numerical quantities, and therefore subject to all the operations of arithmetic during the process of calculation. But in the original equations and the final equations, in which every term has to be interpreted in a physical sense, we must convert every numerical expression into a concrete quantity by multiplying it by the unit of that kind of quantity.

Thus if we write [L] for the unit of length, that is to say, the actual concrete centimetre or foot, and if x denotes the numerical value of a certain line, then the complete expression for the line is $x\,[\mathrm{L}]$; and if y, z, &c., are the numerical values of other lines, then the complete expression for the quantity whose numerical value is $x^{\alpha}y^{\beta}z^{\gamma}$ is

$$x^{\alpha}y^{\beta}z^{\gamma}\left[\mathrm{L}^{\alpha+\beta+\gamma}\right],$$

and this quantity is said to be of $\alpha+\beta+\gamma$ dimensions with respect to [L], the unit of length.

There must be as many different units as there are different kinds of quantities to be measured, but in all dynamical sciences it is possible to define these units in terms of the three fundamental units of length, time, and mass. We therefore suppose these three fundamental units to be given, and deduce all the others from these by the simplest attainable definitions.

The equations at which we arrive must be such that a person of any nation, by substituting for the different symbols the numerical values of the quantities as measured by his own national units, would obtain a true result.

This can only be the case if the equation is homogeneous with respect to each of the fundamental units. To ascertain if it is so we must count the dimensions of every term, and for this purpose we must know the dimensions of any derived units which enter into the equation. The theory of the dimensions of physical quantities were first stated by Fourier, *Théorie de Chaleur*, sec. 160.

By knowing the dimensions of any quantity we are able at once to deduce its numerical value as expressed in terms of one system of units from its numerical value as given in terms of another system.

Thus, magnetic measurements have been made according to the British system, in which the foot, the grain, and the second of mean time are the fundamental units. Other magnetic measurements have been made according to systems derived from the French metric system, using the metre, centimetre, or millimetre as unit of length, the kilogramme, gramme, or milligramme as unit of mass, and the second as unit of time. In recent times an effort has been made to procure the adoption for all scientific measurements of a system in which the centimetre, gramme, and second are the units. This is sometimes referred to as the C. G. S. system, and a copious list of examples of the measurement of physical quantities on this system, of its comparison with other systems, and of the dimensions of quantities occurring in all branches of physics, has been prepared by Dr Everett, and published by the Physical Society of London and by Taylor and Francis, under the title *Illustrations of the C. G. S. System of Units*.

The three fundamental units may be selected each independently of the others, in an entirely arbitrary manner. It is possible, however, by taking advantage of the permanence of the properties of natural substances, so to define the units that one or more of them may be reproduced without reference to any material standard at present existing.

Thus, if the density of a standard substance in a standard state, such as water when at its maximum density under the pressure of its own vapour, is defined as the unit of density, then the unit of mass may be derived from the unit of length, or *vice versa*. In this system, therefore, the dimensions of mass in terms of length are L^3, or of length in terms of mass, $\mathrm{M}^{\frac{1}{3}}$.

We may define the three fundamental units without reference to any actual body, but by means of a natural substance such as water. For if the solid, liquid, and gaseous states of pure water are in equilibrium in a vessel containing no other fluid, the pressure and temperature of the system are determinate. We may therefore define the unit of density in terms of the density of the liquid water under these conditions, and the unit of pressure in terms of the pressure in the vessel. We may deduce the third unit from the law of gravitation, and define the unit of time in terms of the time of revolution of a satellite about a sphere having the unit density at a distance equal to the radius. This time must be calculated from the results of experiments on attraction. Having thus obtained a density, a pressure, and a time, the magnitudes of which are the same under all circumstances, we can derive from them standards of length and mass. For the dimensions of the unit of density [D] are $[\mathrm{ML}^{-3}]$, and those of the unit of pressure [P] are $[\mathrm{ML}^{-1}\mathrm{T}^{-2}]$, so that the dimensions of [L] are $[\mathrm{P}^{\frac{1}{2}}\mathrm{D}^{-\frac{1}{2}}\mathrm{T}]$, and those of [M] are $[\mathrm{P}^{\frac{3}{2}}\mathrm{D}^{-\frac{1}{2}}\mathrm{T}^{3}]$.

This method of defining the three fundamental units is suggested, not as being at all comparable in point of accuracy with the usual methods, but as being an example of a method independent of the preservation of any material standards, whether artificial, as those kept by Government, or natural, as the earth, and its time of revolution. (J. C. M.)

DINÁJPUR, a district of British India, within the Rájsháhí Kuch-Behar division or commissionership, under the lieutenant-governor of Bengal, is situated between 24° 43′ 40″ and 26° 22′ 50″ N. lat., and between 88° 4′ 0″ and 89° 21′ 5″ E. long. The district, which occupies an area of 4126 square miles, is a triangular tract of country with the acute angle towards the north, lying between the districts of Jalpáigurí and Rangpur on the E., and Purniah on the W.; on the S. it is bounded by the districts of Bográ, Rájsháhí, and Maldah. The country is generally flat, but towards the south becomes undulating, some of the elevations being about 100 feet in height. The district is traversed in every direction by a network of channels and water courses. Along the banks of the Kulik river, the undulating ridges and long lines of mango-trees give the landscape an aspect of beauty which is not found elsewhere.

Dinájpur forms part of the rich arable tract lying between the Ganges and the southern slopes of the Himálayas. Although essentially a fluvial district, it does not possess any river navigable throughout the year by boats of 4 tons burden. Rice forms the staple agricultural product. It consists of three species, the *áman* or winter rice (the great harvest of the year), the *áus* or autumn rice, and the *boro* or spring rice. The *áman* and *áus* rice are each subdivided into several varieties. The other crops are oats, barley, millet, maize, oilseeds, pulses, jute, sugar-cane, betel leaf, tobacco, and vegetables. The imperial road from Barhampur to Dárjíling runs through the district for a distance of about 130 miles, and the new Northern Bengal State Railway intersects the district for about 30 miles. The climate of the district, although cooler than that of Calcutta, is very unhealthy, and the people have a sickly appearance. The worst part of the year is at the close of the rains in September and October, during which months few of the natives escape fever. The average maximum temperature is 92·3°, and the minimum 74·8°. The average rainfall is 85·54 inches. The population in 1872 amounted to 1,501,924 souls, equal to 364 persons per square mile,—the Hindus forming 46·8 per cent., and the Mahometans 52·8 per cent.

DINÁJPUR, the principal town and administrative head-quarters of the above district, is situated on the east bank of the Purnabhábá river, in 25° 38′ 0″ N. lat. and 88° 40′ 46″ E. long. The town seems to have declined in importance of late years. In 1808 it was estimated to contain 5000 houses; the census of 1872 returned only 3031. Population in 1872:—Hindus, 5847; Mahometans, 7016; Christians, 99; others, 80:—total (7700 males and 5342 females), 13,042. The disparity in the proportion of the sexes arises from the fact that many of the shopkeepers and traders have houses in the country where they leave their wives and children.

DINAN, a town of France, in the department of Côtes du Nord, about fifteen miles inland, on the left bank of the Rance. The river is navigable for vessels of 150 tons up to the foot of the great granite viaduct which was completed in 1852 across the ravine between the town and the suburb of Lanvallay. The town has a highly picturesque appearance, not only from the position which it occupies on the rocky heights above the river, but also from the numerous remains which it still preserves of the architecture of earlier days. There are considerable portions of the ancient ramparts and towers; the castle of the 14th century still looks down from its height; and many of the houses in the Rue de Jarzuel and the Rue de la Larderie can boast of almost equal antiquity. Of the public buildings may be mentioned the church of St Sauveur, dating from the 12th to the 16th century; the church of St Malo; the town-house, which was formerly a hospital; and the monastery of the Capuchins, now used as a benevolent institution. Besides a good general trade, the inhabitants carry on the manufacture of linen, sailcloth, cotton, thread, beetroot-sugar, and salt. About half a mile from the town are the ruins of the castle and the Benedictine abbey at Lehon, of which the latter is called in the country the Chapelle des Beaumanoirs; near the neighbouring village of St Esprit stands the large lunatic asylum of Les Bas Foins, founded in 1836; and at no great distance is the now dismantled château of La Garaye, which was rendered so famous in the 18th century by the philanthropic devotion of the count and countess whose story is told in Mrs Norton's well-known *Lady of La Garaye*. The principal event in the history of Dinan is the siege by the English under the duke of Lancaster in 1359, during which Duguesclin and an English knight called Thomas of Canterbury engaged in single combat. The memory of the Breton hero's victory is preserved by the name of the *Place Duguesclin*, which marks the site of the lists. Population in 1872, 7469.

DINANT, a town of Belgium, at the head of an arrondissement in the province of Namur, about twelve miles south of Namur, on the railway between that city and Givet. It occupies a narrow site between the River Meuse and a rocky limestone hill which is crowned by a castle; its streets are consequently short and crowded, and a considerable number of its houses are built on terraces cut out on the declivity. A cathedral of the 13th century, richly decorated in the interior, two hospitals, and a Latin school are its principal buildings; and among its industrial establishments are paper-mills, glass-factories, salt-refineries, oil-mills, flour-mills, and works for the cutting and polishing of the black marble which is quarried in the neighbourhood. Population in 1866, 6428.

Dinant is a place of great antiquity. A church was consecrated there in 558, and a second in 604. It did not, however, rise to any importance till the 11th century. In the 12th century it was reckoned a place of great strength, and had attained considerable wealth by means of its industry, especially in the manufacture of copper wares, which were familiarly known as *Dinanderie*. In 1466 Philip the Good, duke of Burgundy, took and destroyed the town and its fortifications; but, three years later, his successor, Charles, allowed it to be rebuilt. It was taken and pillaged by the French in 1554, and again in 1675. By the treaty of Ryswick in 1697 it was restored to the Bishop of Liége, but it was again taken by the French in 1794, and became the capital of an arrondissement in the department of Sambre-et-Meuse.

DINAPUR, a town and military station of British India, is situated on the right or south bank of the Ganges, and on the East Indian Railway, in the district of Patna, province of Behar, about ten miles west of Patna. The town, which stretches along the river bank for about a mile, consists mostly of thatched cottages, one story high, and is not laid out with regard to order or symmetry. Several handsome villas, however, surround the place—the residences of the European officers and the richer natives. Barracks sufficiently large to accommodate 1200 men are situated in Dinapur. In 1857 the sepoy garrison of the place took part in the mutiny of that year, but after a conflict with the European troops were forced to retire from the town. Population about 18,000.

DINARCHUS (Δείναρχος), the orator, son of Sostratus, was born at Corinth about 361 B.C. (Ol. 104, 4). Thus, like at least one greater member of the decade, Lysias, this last of the ten Attic orators was not an Athenian citizen. But his career at Athens, as a resident alien, was at least commenced early in life. When not more than twenty-five, he was already active as a writer of speeches for the law courts. He had been the pupil both of Theophrastus and of Demetrius Phalereus, and had early gained a certain fluent force, and a versatile command of style, which gave him some oratorical repute. His first important contact with public life was in 324 B.C. The Areopagus, after inquiry, reported that nine men had taken bribes from Harpalus, the fugitive treasurer of Alexander. Ten public prosecutors were appointed. Dinarchus wrote, for one or more of these prosecutors, the three speeches which are still extant—one "Against Demosthenes," one "Against Aristogiton," one "Against Philocles." The authenticity of the speech against Demosthenes was indeed denied by Demetrius of Magnesia, chiefly on the ground that it is largely composed of matter taken from Æschines. Westermann went further, and doubted the genuineness of all three speeches. But Schäfer—who justly remarks that the absence of originality and of character is itself characteristic of Dinarchus—is probably right in accepting the general opinion that they are authentic.

It must always be borne in mind that Dinarchus was a Corinthian, a mere resident alien at Athens, whose sympathies were in favour of an Athenian oligarchy under

Macedonian control. Little as the man's life, so far as we know of it, engages our respect or esteem, his position must at least be broadly distinguished from that of such a man as Æschines, an Athenian citizen who, while his city could still be saved, abetted its enemies—or from that of such a hireling as Demades. In the Harpalus affair, Demosthenes was, beyond all reasonable doubt, innocent, and so, probably, were others of the accused. Yet Hyperides, the most fiery of the patriots, was on the same side as Dinarchus.

Under the regency—for such it really was—of his old master, Demetrius Phalereus, Dinarchus had much political influence. The years 317–306 B.C. were the most prosperous of his life. On the fall of Demetrius Phalereus, Dinarchus withdrew into exile at Chalcis in Eubœa. About 292 B.C. he ventured to return to Attica, and took up his abode with a former associate, Proxenus, in the country, against whom he afterwards brought an action, on the ground that Proxenus had robbed him of some money and plate which he had brought with him. He died at Athens, at the age of about seventy, *i.e.*, about 291 B.C.

Dionysius held that, out of 85 extant speeches bearing the name of Dinarchus, 58 were genuine,—28 in public causes, 30 in private causes. In addition to the three speeches above mentioned, we have scanty fragments of 88 more which passed, with at least some authors, under his name. The number need not surprise us, when we remember that Suidas speaks of 160 speeches of Dinarchus, and (following Cæcilius probably) allows 60 as genuine. No orator of the Attic decade had so little of an individual style, and to no other, consequently, was alien work so largely ascribed by the Alexandrian critics. Dinarchus imitated by turns the style of Lysias, of Hyperides, of Demosthenes. As Dionysius says of him, *οὐδὲν οὔτε κοινὸν οὔτ' ἴδιον ἔσχεν*, he had no general stamp of his own, no distinctive trait. He was neither an inventor, like Lysias, Isocrates, and Isæus, nor a perfecter like Æschines, Hyperides, and Demosthenes. He is called by Hermogenes *ὁ κρίθινος Δημοσθένης*,—a metaphor taken either from barley compared with wheat, or, better perhaps, from beer compared with wine,—a Demosthenes whose strength is rougher, and who has neither the flavour nor the sparkle.

Our best MSS. are the *Codex Crippsianus* and the *Codex Oxoniensis* (containing also Antiphon, Andocides, Isæus, Lycurgus.) The three extant orations, with the fragment ascribed to Demades, ed. F. Blass, Lips. 1871. The fragments in Baiter and Sauppe's *Oratores Attici*, vol. ii.

DINGWALL, a royal burgh of Scotland, the county town of Ross-shire, 15 miles north-west of Inverness, at the junction of the Sutherland and Dingwall and Skye railways. It occupies a low situation at the upper end of Cromarty Firth, where the valley of Strathpeffer unites with the alluvial lands at the mouth of the Conan. Though a neatly built and thriving place, it has nothing special to show except the curious old town-house, a few remains of the ancient mansion-house of the powerful family of Ross, and an obelisk 57 feet in height, erected to the memory of George, first earl of Cromarty. Dingwall, like so many towns on the same coast, is of Norse origin, and its name in Scandinavian signifies the Court Hill. In Gaelic it is known as Inbhir-pheoran, or the mouth of the Peffer. Its charter, granted by Alexander II., was renewed by James IV. It unites with Tain, Dornoch, Wick, Kirkwall, and Cromarty in returning one member to Parliament. Population in 1871, 2125.

DINKELSBÜHL, a town of Bavaria, in the department of Mittelfranken, or Middle Franconia, on the Wörnitz, about 40 miles by rail from Donauwörth, where the river joins the Danube. It is an important centre both of civil and ecclesiastical administration, and has a Roman catholic and a Protestant church, a Latin and industrial school, and several benevolent institutions. The inhabitants carry on the manufacture of gloves, stockings, and other articles, and deal largely in cattle. Fortified by Henry I., Dinkelsbühl received in 1305 the same municipal rights as Ulm, and obtained in 1351 the position of a free imperial city, which it retained till 1803. Its municipal code, the *Dinkelsbühler Recht*, printed in 1536, and re-published in a revised form in 1738, contained a very extensive collection of laws on matters both of public and private interest. Population in 1875, 5238.

DINOCRATES (called by Pliny Dinochares), a Greek architect, who lived in the reign of Alexander the Great. He applied to that king's courtiers for an introduction to the Macedonian king, but was put off from time to time with vain promises. Impatient at the delay, he is said to have laid aside his usual dress, besmeared his body with oil in the manner of an athlete, thrown a lion's skin over his shoulders, and, with his head adorned with a wreath of palm branches, and a club in his hand, made his way through a dense crowd which surrounded the royal tribunal to the place where the king was dispensing justice. Amazed at the strange sight, Alexander asked him who he was. He replied that he had come into the royal presence to make known a scheme which would be worthy of the consideration of the greatest monarch in the world. Out of Mount Athos, a mountain rising like a pyramid to a height of 6780 feet topped with a cone of white limestone, he proposed to construct the gigantic figure of a man, holding a large city in his right hand, while in his left he held a gigantic tank large enough to contain all the water from the brooks in the peninsula. The story goes that the king was not displeased with the idea, but, as he thought it chimerical, it came to nothing. Alexander, however, was so delighted with the man, and with his bold and daring conceptions, that he carried Dinocrates with him when he went on his campaigns against Darius. He was employed by the king to design and lay out the city of Alexandria. This city was founded in 332 B.C., but the untimely death of Dinocrates prevented it from assuming the proportions intended by its designer. The Ephesians, whose temple of Diana had just been burnt down, employed him in its reconstruction. But perhaps the most original of all his conceptions was his design for a temple to Arsinoë, wife of Ptolemy II., king of Egypt. The roof of the building was to have been composed of a mass of loadstones, strong enough to hold floating in the air, and suspended within it, an iron statue of the queen.

DINORNIS (δεινός, terrible, and ὄρνις, bird), a genus of gigantic Struthious birds, believed to be extinct, which in post-Pliocene times must have formed a principal feature in the fauna of New Zealand. Their remains are found in greatest abundance in the provinces of Otago and Canterbury, often strewn in great profusion over the surface of the ground, but more usually met with buried in alluvial deposits, and in swamps; and they indicate that many of the species attained a huge size—thus the tibia of *Dinornis giganteus* measures about a yard in length, and the bird itself must have stood 10 or 11 feet high. Another species, *Dinornis elephantopus*, although less in height, possessed, according to Professor Owen, the most massive skeleton in the entire order of birds, its toe bones almost rivalling those of the elephant. Wing bones are believed to have been entirely wanting in those species which now constitute the genus Dinornis, as also the fourth toe, which is present along with rudimentary wing bones in the species which have been placed in the new genus Palapteryx. Among living birds Dinornis agrees most closely with the Apteryx, the diminutive living representative in New Zealand of this gigantic race of bipeds, while somewhat resembling the emeu and cassowary in the formation of