

of platinum, which are introduced into a suitable vessel of platinum, an arrangement by which it will be evident much time may be saved. The boiling is then continued for fifteen or twenty minutes, when the cornets are washed with distilled water, and treated with nitric acid of specific gravity 1.3, and in this the cornets remain for about the same period, after which they are again washed in distilled water and dried.

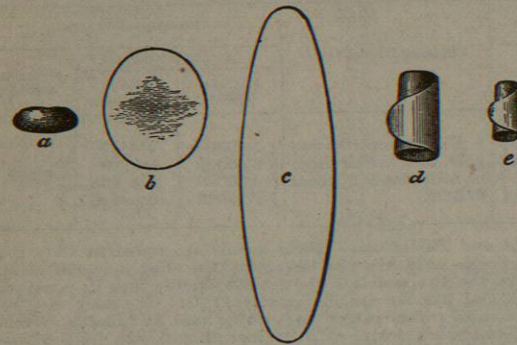


Fig. 11.

(5.) The cornets are annealed, separately, in little clay crucibles, or in the platinum cups in which they have been boiled, by heating them to bright redness. They then diminish considerably in bulk as *c* (fig 11), and are of a pure yellow colour.

(6.) The cornets are then weighed in comparison with "check assays" made on pure gold. These "checks" are necessary, as the accuracy of the result of an assay is liable to be affected either by retention of silver or copper, or by loss of gold by volatilization in the muffle, solution in the acid, or retention in the cupel. The weight of gold, therefore, indicated by the balance, may be either less or greater than the amount originally present in the alloy. The correction to be applied to a gold assay will be evident from the following formula:—

Let 1000 be the weight of alloy originally taken;  
 $p$  the weight of the piece of gold finally obtained;  
 $x$  the actual amount of gold in the alloy expressed in thousandths;  
 $a$  the weight of gold (supposed to be absolutely pure) taken as a check, which approximately equals  $x$ ;  
 $b$  the loss or gain in weight experienced by  $a$  during the process of assay, expressed in thousandths;  
 $k$  the variation of "check gold" from absolute purity, expressed in thousandths;  
 then the actual amount of fine gold in the check-piece =  $a(1 - \frac{k}{1000})$ , and  $x$  the corrected weight of the assay will =  $p - \frac{ak}{1000} \pm b$ ;  $b$  being added or subtracted according as it is a loss or gain.

If  $a$  be assumed to be equal to  $x$  this equation becomes  
 $x = \frac{p \pm b}{1 + \frac{k}{1000}}$

Example.—Let  $p = 901.1$  thousandths.

$a = 920.0$  " gain in weight.  
 $b = 0.3$  "  
 $k = 0.1$  "

Then by the first formula—

$$x = 901.1 - \frac{920 + 0.1}{1000} - 0.3;$$

For, as  $b$  is a gain in weight, it must be deducted, hence

$$x = 901.1 - 0.092 - 0.3$$

$$= 900.708.$$

And by the second formula—

$$x = \frac{901.1 - 0.3}{1 + \frac{0.1}{1000}}$$

$$= 900.708$$

Assay of Gold Ores.—500 grains of the finely powdered sample, which must be taken with the greatest care and accuracy, is passed through a sieve of fine wire gauze with at least 80 meshes to the linear inch. Any residue there may be of flattened particles of gold is set aside for subsequent treatment, usually by direct cupellation. Assay of the ore by fusion with litharge is best suited to ores which do not contain much iron pyrites. For auriferous quartz

<sup>1</sup> Fourth Annual Report of the Deputy-Master of the Mint, 1873, p. 42.

500 grains of the ore are fused with 500 grains of red lead, 300 grains of sodic carbonate, 20 grains of powdered charcoal, and 250 grains of borax. The mixture is introduced into a clay crucible, which it should half fill, and is fused in an air furnace. The button of reduced lead may be removed, either by pouring the contents of the crucible into a mould, or by breaking the crucible when cold. If the ore contains much iron pyrites, or is of the nature of "sweep," the name given to carbonaceous residues which accumulate in mints and goldsmiths' shops, it will be necessary to roast it in a shallow fire-clay dish placed in a muffle. In the case of pyrites containing about 7 dwts. to the ton, the operation would be conducted on about 1000 grains. The roasted ore is then fused with about the same mixture of fluxes as has been given for quartz.

Assay by Scorification.—Scorification resembles cupellation, but the oxide of lead produced in the operation, instead of sinking into a porous cup, is held in a flat saucer of fire-clay, and dissolves the earthy constituents of the ore, leaving the precious metal to pass into another portion of lead which remains in the metallic state. About 200 grains of the roasted ore are placed in the scorifier, intimately mixed with 500 grains of granulated and 50 grains of borax lead; 500 grains of lead are then distributed over the surface of the mixture; the contents of the scorifier are fused in a muffle; air is admitted to oxidize the greater portion of the lead; and, at the conclusion of the operation, the litharge should be perfectly fluid and cover the molten lead. The slag may be freed from particles of precious metal by the addition at the conclusion of the operation of a small quantity of powdered anthracite, which reduces a portion of the litharge to metallic globules, which fall through the slag and unite with the lead button. The gold is then separated by cupellation, and the silver with which it is nearly always associated is removed by parting in nitric acid.

Assay by means of the Spectroscope.—Lockyer and Roberts<sup>2</sup> state, as the result of a careful spectroscopic investigation of the alloys of gold and copper, that it is possible to distinguish between alloys of these metals which only differ in proportion by  $\frac{1}{10000}$ th part. Their experiments have been repeated in America by A. E. Outerbridge.<sup>3</sup> (W. C. R.—H. B.)

It will be convenient to give here, in connexion with the article GOLD, rather than in their proper alphabetical place, the articles GOLDBEATING and GOLD LACE.

GOLDBEATING. The art of goldbeating is of great antiquity, being referred to by Homer; and Pliny states that one ounce of gold was extended to 750 leaves, each leaf being four fingers square, which is three times the thickness of the ordinary leaf gold of the present time. In all probability the art originated among Oriental communities, where the working of gold and the use of gold ornaments have been distinguishing characteristics from the most remote periods; and in India goldbeating is still carried on as a craft involving many mysteries and great difficulties. On the coffins of the Theban mummies specimens of original leaf-gilding are met with, where the gold is in so thin a state that it resembles modern gilding. The Incas of Peru do not appear to have been able to reduce gold further than to plates which could be nailed for ornamentation on the walls of their temples. In England goldbeating was confined to London until within the present century. It was introduced into Scotland and the United States within that period, and it is now practised in most towns of any considerable size; but so far as concerns Great Britain it is principally centred in London. One grain of gold has been beaten out to the extent of 75 square inches, and the same weight of silver to 98 square inches. Taking a cubic inch of gold at 4900 grains, this gold-leaf is the 367,650th part of an inch in thickness, or about 1200 times thinner than ordinary printing paper. The silver, though spread over a larger surface, was thicker, owing to the difference in its specific gravity; but, calculated by weight, silver is the most malleable metal with which we are acquainted, in that respect considerably exceeding gold. This experiment does not, however, determine the extent of the malleability of either metal, as the means employed to test it were found to fail before there was any appearance of the malleability of the metals

<sup>2</sup> Phil. Trans., 1874, vol. clxiv, p. 495.

<sup>3</sup> Journal of the Franklin Institute, 1874

being exhausted. In practice the average degree of tenuity to which the gold is reduced is not nearly so great as the example above quoted. A "book of gold" containing 25 leaves measuring each  $3\frac{1}{4}$  inches, equal to an area of 264 square inches, generally weighs from 4 to 5 grains.

The gold used by the goldbeater is variously alloyed, according to the variety of colour required. Fine gold is commonly supposed to be incapable of being reduced to thin leaves. This, however, is not the case, although its use for ordinary purposes is undesirable on account of its greater cost. It also adheres on one part of a leaf touching another, thus causing a waste of labour by the leaves being spoiled; but for work exposed to the weather it is much preferable, as it is more durable, and does not tarnish or change colour. The external gilding on many public buildings, such, e.g., as the Albert Memorial in Hyde Park, London, is done with pure gold. The following is a list of the principal classes of leaf recognized and ordinarily prepared by British beaters, with the proportions of alloy per ounce they contain.

Name of Leaf	Proportion of Gold.	Proportion of Silver.	Proportion of Copper.
	Grains.	Grains.	Grains.
Red.....	456-460	...	20-24
Pale red.....	464	...	16
Extra deep.....	456	12	12
Deep.....	444	24	12
Citron.....	440	30	10
Yellow.....	408	72	...
Pale yellow.....	384	96	...
Lemon.....	360	120	...
Green or pale.....	312	168	...
White.....	240	240	...

The process of goldbeating is thus conducted. The gold, having been alloyed according to the colour desired, is melted in a crucible, at a higher temperature than is simply necessary to fuse it, as its malleability is improved by exposure to a greater heat; sudden cooling does not interfere with its malleable properties, gold differing in this respect from some other metals. It is then cast into an ingot, and flattened, by rolling between a pair of powerful smooth steel rollers, into a ribbon of  $1\frac{1}{2}$  inch wide and 10 feet in length to the ounce. After being flattened it is annealed and cut into pieces of about  $\frac{1}{4}$  grs. each, or about 75 per ounce, and placed between the leaves of a "cutch," which is about half an inch thick and  $3\frac{1}{2}$  inches square, containing about 180 leaves of a tough paper manufactured in France. Formerly fine vellum was used for this purpose, and generally still it is interlaced in the proportion of about one of vellum to six of paper. The cutch is beaten on for about 20 minutes with a 17-pound hammer, which rebounds by the elasticity of the skin, and saves the labour of lifting, by which the gold is spread to the size of the cutch; each leaf is then taken out, and cut into four pieces, and put between the skins of a "shoder,"  $4\frac{1}{2}$  inches square and  $\frac{3}{4}$ ths of an inch thick, containing about 720 skins, which have been worn out in the finishing or "mould" process. The shoder requires about two hours' beating upon with a 9-pound hammer. As the gold will spread unequally, the shoder is beaten upon after the larger leaves have reached the edges. The effect of this is that the margins of larger leaves come out of the edges in a state of dust. This allows time for the smaller leaves to reach the full size of the shoder, thus producing a general evenness of size in the leaves. Each leaf is again cut into four pieces, and placed between the leaves of a "mould," composed of about 950 of the finest gold-beaters' skins, five inches square and three-quarters of an inch thick, the contents of one shoder filling three moulds. The material has now reached the last and most difficult stage of the process; and on the fineness of the skin and judgment of the workman the perfection and thinness of the leaf of gold depend. During the first hour the hammer is allowed to fall principally upon the centre of the mould. This causes gaping cracks upon the edges of the leaves, the sides of which readily coalesce and unite without leaving any trace of the union after being beaten upon. At the second hour, when the gold is about the 150,000th part of an inch in thickness, it for the first time permits the transmission of the rays of light. In pure gold, or gold but slightly alloyed, the green rays are transmitted; and in gold highly alloyed with silver, the pale violet rays pass. The mould requires in all about four hours' beating with a 7-pound hammer, when the ordinary thickness for the gold leaf of commerce will be reached. A single ounce of gold will at this stage be extended to  $75 \times 4 \times 4 = 1200$  leaves, which will trim to squares of about  $3\frac{1}{4}$  inches each. The finished leaf is then taken out of the mould,

and the rough edges are trimmed off by slips of the ratan fixed in parallel grooves of an instrument called a waggon, the leaf being laid upon a leathern cushion for that purpose. The sizes to which British leaf is cut are 3,  $3\frac{1}{4}$ ,  $3\frac{1}{2}$ ,  $3\frac{3}{4}$ , and  $3\frac{1}{2}$  inches. The leaves thus prepared are placed into "books" capable of holding 25 leaves each, which have been rubbed over with red ochre to prevent the gold clinging to the paper. The leaf is used for gilding picture-frames, and for other ornamental purposes. See GILDING.

The fine membrane called goldbeaters' skin, used for making up the shoder and mould, is the outer coat of the cæcum or blind gut of the ox. It is stripped off in lengths about 25 or 30 inches, and freed from fat by dipping in a potash solution and scraping with a blunt knife. It is afterwards stretched on a frame; two membranes are glued together, treated with a solution of aromatic substances or camphor in isinglass, and subsequently coated with white of egg. Finally they are cut into squares of 5 or  $5\frac{1}{2}$  inches; and to make up a mould of 950 pieces the gut of about 380 oxen is required, about  $2\frac{1}{2}$  skins being got from each animal. A skin will endure about 200 beatings in the mould, after which it is fit for use in the shoder alone.

The dryness of the cutch, shoder, and mould is a matter of extreme delicacy. They require to be hot-pressed every time they are used, although they may be used daily, to remove the moisture which they acquire from the atmosphere, except in extremely frosty weather, when they acquire so little moisture that then a difficulty arises from their over-dryness, whereby the brilliancy of the gold is diminished, and it spreads very slowly under the hammer. On the contrary, if the cutch or shoder be damp, the gold will become that which is technically termed hollow or sieve-like; that is, it is pierced with innumerable microscopical holes; and in the moulds in its more attenuated state it will become reduced to a pulverulent state. This condition is more readily produced in alloyed golds than in fine gold. It is necessary that each skin of the mould should be rubbed over with calcined gypsum (the fibrinated variety) each time the mould may be used, in order to prevent the adhesion of the gold to the surface of the skin in beating. Dentist gold is gold leaf carried no further than the cutch stage, and should be perfectly pure gold.

By the above process also silver is beaten, but not so thin, the inferior value of the metal not rendering it commercially desirable to bestow so much labour upon it. Copper, tin, zinc, palladium, lead, cadmium, platinum, and aluminium can be beaten into thin leaves, but not to the same extent as gold or silver.

GOLD AND SILVER LACE. Under this heading a general account may be given of the use of the precious metals in textiles of all descriptions into which they enter. That these metals were used largely in the sumptuous textiles of the earliest periods of civilization there is abundant testimony; and to this day, in the Oriental centres whence a knowledge and the use of fabrics inwoven, ornamented, and embroidered with gold and silver first spread, the passion for such brilliant and costly textiles is still most strongly and generally prevalent. The earliest mention of the use of gold in a woven fabric occurs in the description of the ephod made for Aaron (Exod. xxxix. 2, 3)—"And he made the ephod of gold, blue, and purple, and scarlet, and fine twined linen. And they did beat the gold into thin plates, and cut it into wires (strips), to work it in the blue, and in the purple, and in the scarlet; and in the fine linen, with cunning work." In both the *Iliad* and the *Odyssey* distinct allusion is frequently made to inwoven and embroidered golden textiles. Many circumstances point to the conclusion that the art of weaving and embroidering with gold and silver originated in India, where it is still principally prosecuted, and that from one great city to another the practice travelled westward,—Babylon, Tarsus, Baghdad, Damascus, the islands of Cyprus and Sicily, Con-



stantinople and Venice, all in the process of time becoming famous centres of these much prized manufactures. Alexander the Great found Indian kings and princes arrayed in robes of gold and purple; and the Persian monarch Darius, we are told, wore a war mantle of cloth of gold, on which were figured two golden hawks as if pecking at each other. There is reason, according to Josephus, to believe that the "royal apparel" worn by Herod on the day of his death (Acts xii. 21) was a tissue of silver. Agrippina, the wife of the emperor Claudius, had a robe woven entirely of gold, and from that period downwards royal personages and high ecclesiastical dignitaries used cloth and tissues of gold and silver for their state and ceremonial robes, as well as for costly hangings and decorations. In England, at different periods, various names were applied to cloths of gold, as ciclatoun, tartarium, naques or nac, baudekin or baldachin, Cyprus damask, and twsewys or tissue. The thin flimsy paper known as tissue paper, is so called because it originally was placed between the folds of gold "tissue" to prevent the contiguous surfaces from fraying each other. At what time the drawing of gold wire for the preparation of these textiles was first practised is not accurately known. The art was probably introduced and applied in different localities at widely different dates, but down till mediæval times the method graphically described in the Pentateuch continued to be practised with both gold and silver.

Fabrics woven with gold and silver continue to be used on the largest scale to this day in India; and there the preparation of the varieties of wire, and the working of the various forms of lace, brocade, and embroidery, is at once an important and peculiar art. The basis of all modern fabrics of this kind is wire, the "gold wire" of the manufacturer being in all cases silver gilt wire, and silver wire being, of course, composed of pure silver. In India the wire is drawn by means of simple draw-plates, with rude and simple appliances, from rounded bars of silver, or gold-plated silver, as the case may be. The wire is flattened into the strip or ribbon-like form it generally assumes by passing it, fourteen or fifteen strands simultaneously, over a fine, smooth, round-topped anvil, and beating it as it passes with a heavy hammer having a slightly convex surface. From wire so flattened there is made in India *soniri*, a tissue or cloth of gold, the web or warp being composed entirely of golden strips, and *ruperi*, a similar tissue of silver. Gold lace is also made on a warp of thick yellow silk with a weft of flat wire, and in the case of ribbons the warp or web is composed of the metal. The flattened wires are twisted around orange (in the case of silver, white) coloured silk thread, so as completely to cover the thread and present the appearance of a continuous wire; and in this form it is chiefly employed for weaving into the rich brocades known as kincobs or kinkhabs. Wires flattened, or partially flattened, are also twisted into exceedingly fine spirals, and in this form they are the basis of numerous ornamental applications. Such spirals drawn

**GOLDAST, MELCHIOR HAIMINSFELD (1576-1635)**, an historical writer and collector whose works did great service to the study of the older documents of Germany, was born, January 6, 1576 (or 1578), of poor Protestant parents, near Bischofzell in Thurgau. His university career at Ingoldstadt and Altdorf was cut short by his poverty; but at length, in 1603, after he had spent some time at St Gall and Geneva, partly supported by the learned and benevolent jurist Bartholomeus Schobinger, he obtained the post of secretary to Henry, duke of Bouillon, and with him he went to Heidelberg and Frankfort-on-the-Main. But Goldast,

out till they present a waved appearance, and in that state flattened, are much used for rich heavy embroideries termed karchobs. Spangles for embroideries, &c., are made from spirals of comparatively stout wire, by cutting them down ring by ring, laying each C-like ring on an anvil, and by a smart blow with a hammer flattening it out into a thin round disk with a slit extending from the centre to one edge. Fine spirals are also used for general embroidery purposes. The demand for various kinds of loom-woven and embroidered gold and silver work in India is immense; and the variety of textiles so ornamented is also very great. "Gold and silver," says Dr Birdwood in his *Handbook to the British-Indian Section, Paris Exhibition, 1878*, "are worked into the decoration of all the more costly loom-made garments and Indian piece goods, either on the borders only, or in stripes throughout, or in diapered figures. The gold-bordered loom embroideries are made chiefly at Sattara, and the gold or silver striped at Tanjore; the gold figured *mashrus* at Tanjore, Trichinopoly, and Hyderabad in the Deccan; and the highly ornamented gold-figured silks and gold and silver tissues principally at Ahmedabad, Benares, Murshedabad, and Trichinopoly."

Among the Western communities the demand for gold and silver lace and embroideries arises chiefly in connexion with naval and military uniforms, court costumes, public and private liveries, ecclesiastical robes and draperies, theatrical dresses, and the badges and insignia of various orders. To a limited extent there is a trade in gold wire and lace to India and China. The metallic basis of the various fabrics is wire round and flattened, the wire being of three kinds—1st, gold wire, which is invariably silver gilt wire; 2d, copper gilt wire, used for common liveries and theatrical purposes; and 3d, silver wire. These wires are drawn by the ordinary processes, and the flattening, when done, is accomplished by passing the wire between a pair of revolving rollers of fine polished steel. The various qualities of wire are prepared and used in precisely the same way as in India,—round wire, flat wire, thread made of flat gold wire twisted round orange-coloured silk or cotton, known in the trade as "orris," fine spirals and spangles, all being in use in the West as in the East. The lace is woven in the same manner as ribbons, and there are very numerous varieties in richness, pattern, and quality. Cloth of gold, and brocades rich in gold and silver, are woven for ecclesiastical vestments and draperies.

The proportions of gold and silver in the gold thread for the lace trade varies, but in all cases the proportion of gold is exceedingly small. An ordinary gold lace wire is drawn from a bar containing 90 parts of silver and 7 of copper, coated with 3 parts of gold. On an average each ounce troy of a bar so plated is drawn into 1500 yards of wire; and therefore about 16 grains of gold cover a mile of wire. It is estimated that about 250,000 ounces of gold wire are made annually in Great Britain, of which about 20 per cent. is used for the headings of calico, muslin, &c., and the remainder is worked up in the gold lace trade.

though able and laborious, had fallen into an unsettled way of life, and in 1604 we find him in the service of the Baron Hohensax—then the possessor of that unique manuscript of old German poems which now forms one of the treasures of the National Library at Paris, and which Goldast was the first to make partially accessible by the press. Before long he was back in Switzerland, and by 1606 he was again in Frankfort living by his pen, and finding his efforts to obtain a regular post frustrated by Lipsius and Scioptius, whom he had offended by his outspokenness. In 1611 he was appointed councillor at the

court of Saxe Weimar; in 1615 he entered the service of the count of Schaumburg at Bückeberg, and in 1625 returned to Frankfort. As the transport of his books from Bückeberg to Frankfort was attended with danger, owing to the warlike operations then on foot, he entrusted them to the town of Bremen, and they now form part of the municipal library. Appointed in 1627 councillor to the emperor and to the elector of Treves, Goldast soon after passed into the service of the landgrave of Hesse-Darmstadt, who raised him to be chancellor of the university of Giessen. He died at Giessen in the beginning of 1635. Nothing perhaps proves the value of Goldast's labours better than the fact that, in consideration of the service he has rendered, the modern historical and philological investigator is willing to condone the almost unpardonable sin of direct literary forgery of which he has been accused and convicted.

Among his more important works are his *Parandicorum veterum* (Lille, 1604), which contained the *Kunig Tyro von Schottland*, the *Winsbeken*, and the *Winsbekin*; *Iterum Alamannicarum Scriptores*, Frankf. 1606, 3 vols., new ed. by Senckenberg, *ibid.* 1780; *Monarchia S. Romani imperii*, Frankf. 1621; *Commentarii de regno Bohemæ*, Hanover, 1627, new ed. by H. Schmink, Frankf. 1719. He edited the works of Pirkheimer and De Thou; and a volume of correspondence, *Virorum Cui. ad Goldastium epistolæ*, was published in 1688. See Senckenberg's *Goldasti Memoria*, prefixed to *Rev. Almann. Scrip.*, 1780; Bayle's *Dictionary*; and Von Raumer, *Geschichte der germanischen Philologie*, Munich, 1870.

**GOLDBERG**, a town in the Prussian province of Silesia, capital of a circle in the government district of Liegnitz, is situated 14 miles S.W. of that town, on the Katzbach, an affluent of the Oder. The principal buildings are an old church dating from the beginning of the 13th century, the Schwabe-Priesemuth institution, completed in 1876, for the board and education of orphans; and the gymnasium, which in the 17th century enjoyed great prosperity, and numbered Wallenstein among its pupils. The chief manufactures are woollen cloth, flannel, gloves, stockings, leather, and beer, and there is a considerable trade in corn and fruit. Goldberg owes its origin and name to a gold mine in the neighbourhood, which, however, has been wholly abandoned since the time of the Hussite wars. Population (1875), 6492.

The town suffered heavily from the Tartars in 1241, from the plague in 1334, from the Hussites in 1428, and from the Saxon, imperial, and Swedish forces during the Thirty Years' War. On 27th May 1813 a battle took place near it between the French under MacDonald and the rear guard of the Russians under Wittgenstein; and on the 23d August of the same year a skirmish, in which MacDonald suffered defeat from the Prussians under Blücher.

**GOLD COAST**, a British colony in Western Africa reconstituted on the 24th of July 1876 by a royal charter which defines it as consisting of two settlements—(1) the Gold Coast proper, comprising "all places, settlements, and territories which may at any time belong to us in Western Africa, between the fifth degree of west longitude and the second degree of east longitude; and (2) the settlement of Lagos, similarly comprising all possessions between the second and fifth degrees of east longitude." The charter appoints a governor, establishes a legislative and an executive council, and authorizes the appointment of judges and other legal officers, &c. Both the Gold Coast colony and Lagos had previously been administered by lieutenant-governors dependent on the governor of Sierra Leone; and the two divisions are still sufficiently distinct to require separate treatment.

By Bosman, the Dutch factor at Elmina in the beginning of the 18th century, the Gold Coast is said to extend "about 60 miles, beginning with the Gold River, 3 miles west of Assini, or 12 miles above Axim, and ending with the village Ponni, 7 or 8 miles east of Acra."<sup>1</sup> In modern times, Cape Apollonia (2° 35' W. long.) being

<sup>1</sup> See *Namokeurige Beschryving van de Guinese Goud-Tand-en-Szwe Kust*, Amsterdam, 1709 (frequently translated).

accepted as the western boundary, and the mouth of the Volta river (0° 41' 2" E. long.) as the eastern, the whole coast measures about 225 miles, and this is divided into two sections, the windward or western and the leeward or eastern, the boundary between the two being the Secoom river (0° 3' 2" W. long.). Beginning at the west, the first places on the coast that deserve to be mentioned are Grand Bassam and Assini, both French settlements up to 1870. The mouth of the river Assini forms the outlet of a series of lagoons, the eastmost of which is fed by a considerable river—the Tanno or Tando. About 55 miles eastward from this point are the Four Hills or Hummocks of Apollonia, where the English formerly had a fort; and about 20 miles from Apollonia is the mouth of the Ankobne. Three miles further and we come to Axim, the site of an old Dutch fort built near the mouth of the Axim river; and other 20 miles and we reach Great Friedrichsburg, founded by the Brandenburg Company. Rounding Cape Three Points (2° 7' W. long.), whose vicinity is marked by a line of breakers nearly 2½ miles long, the first place of importance that we find is Akodah or Aquidah, and 10 miles beyond Akodah lies the better known Dixcove or Dick's Cove. From Dixcove Pombendi is distant 10 miles, and other 12 or 13 miles brings us to Secondee, which is only 8 or 9 miles from the mouth of the Busum (or Sacred) Prah. With the exception of the Volta this is the largest river of the Gold Coast; it is on one of its sub-tributaries that Coomassee is situated. At the mouth of the Beyah, 19 or 20 miles eastward, stands Elmina, or in the native language Edena, one of the most important posts of European settlement, with a native population of some 10,000 (see **ELMINA**). Eight miles east of Elmina is Cape Coast Castle, which was the capital of the British territory until 1876. Anamaboe, 10 miles distant, is a town of some 4000 or 5000 inhabitants, with a free port and a good landing-place; and about 38 miles further on we come to Winnebah, which up till 1812 was the seat of an English fort. About 11 miles eastward there is another abandoned fort at Barrocoe; and at Barrocoe we are only 23 miles from Acra or Accra (in Tshi Nkran), the present capital of the Gold Coast colony. It was selected instead of Cape Coast Castle on account of its comparatively healthy position. In the words of Dr A. F. Elliot, it is the healthiest station on the west coast of Africa, being surrounded for miles by fresh undulating ground, and backed at the distance of a day's journey, or about 30 miles, by a range of hills where Europeans can recruit. A sanitary station has been fixed at Akropong, 1800 feet above the sea-level, where the Basel missionaries have their headquarters. About 2 miles east of Acra is the old Danish fort of Christiansborg. There is no station of much importance except Tassi, Ponce, and Great Ningo or Ningua, in the 60 miles between Acra and the Volta. The Volta, otherwise known as the Firaw, the Shilao, or the Amu, is a large river, the course of which has been only partially explored, but which may be expected to furnish a means of opening up the interior. In December 1875, M. M. J. Bonnat, journeying partly by water and partly by land, proceeded as far as Salaha or Paraha, a commercial town of some 18,000 inhabitants. He reports that the Labelle rapids, though 25 feet high, can be ascended by steamers during the rains in September and October, because at that season the river rises 50 feet. The lower part of the course is of difficult navigation in the dry season owing to the shallows. Addah, on the right bank of the river near its mouth; Quittah, the seat of a British fort; and Jellah Coffi, a trading port, are the principal places on the coast between the Volta and Flouhow, which lies at the eastmost extremity of the Volta lagoon. According to the ordinary divisions we enter the Slave Coast when we proceed east of the Volta.



Such are the chief points of interest along the Gold Coast, but there is a considerable range of territory extending from 20 to 60 miles inland, which belongs to the colonial protectorate; and about this a few words are necessary. The western portion of the protectorate is occupied by the woody hill country of Fanti, which stretches northwards towards Ashantee. From the mouth of the Secoom a fine range varying in height from 1200 to 1500 or 1600 feet stretches N.N.E., and divides the eastern portion into two halves. Between the mountains and the sea there are large stretches of prairie land, in which the grass grows to a height of 10 or 12 feet.

The inhabitants of the Gold Coast may be divided into two great classes—the Tshi or Chee, a black type, and the Aca, a red type. The Fantis and Ashantis, both belonging to the former class, have already been described in ASHANTEE. The Akems live in a thick forest region, and maintain existence by hunting, gold-digging, and the gathering of wood snails. The capital of their country is Kyebi.<sup>1</sup> The Aquapems are extensively engaged in agriculture and in trade, both with the other tribes and with Europeans. The Ga or Aca, a clever race, greatly modified by contact with European culture, are to be found in all the towns of the West African coast as artisans and sailors. They are employed by the interior tribes as middle men and interpreters. On the right bank of the Volta are the Adangme<sup>2</sup> or Adampe, distinguished by strength and rudeness. The Crobos live in little villages in the midst of the palm tree woods which grow round about the Croboberg, an eminence about 1000 feet high.

The Tshi or Chee language<sup>3</sup> belongs to the great prefix-pronominal group. It comprises many dialects, which may, however, be reduced to two classes or types.<sup>4</sup> Akan dialects are spoken in Assini, Amanahia (Apollonia), Awini, Ahanta, Wasaw, Tshiforo (Juffer or Tufel), and Denkyera in the west, and in Asen, Akem, and Aquapem in the east, as well as in the different parts of Ashantee. Fante dialects are spoken, not only in Fanti proper, but in Afutu or the country round Cape Coast, in Abora, Agyrnako, Akomfi, Gomoa, and Agona. The difference between the two types is not very great; a Fanti, for example, can converse without much difficulty with a native of Aquapem or Ashantee, his language being in fact a deteriorated form of the same original. Akem is considered the finest and purest of all the Akan dialects. The Aquapem, which is based on the Akem but has imbibed Fanti influences, has been made the book-language by the Basel missionaries. About a million people in all, it is estimated, speak dialects of the Tshi. The south-eastern corner of the Gold Coast is occupied by another language known as the Ga or Aca, which comprises the Ga proper and the Adangme and Crobo dialects. Ga proper is spoken by about 40,000 people, including the inhabitants of Ga and Kinkā (i.e., Dutch and British Aca, in Tshi, Nkran, and Kankan, Osu (i.e., Christiansborg), La, Tessi, Ningua, and numerous inland villages. It has been reduced to writing by the missionaries. The Adangme and Crobo dialects are spoken by about 80,000 people. They differ very considerably from Ga proper, but books printed in Ga can be used by both the Crobo and Adangme natives. Another language known as Guan is used in parts of Aquapem and in Anum beyond the Volta; but not much is known either about it or the Obutu tongue spoken in a few towns in Agona, Gomoa, and Akomfi. The dialects of the Ahanta country have still to be investigated.<sup>5</sup>

Mahometanism and Christianity are both making themselves felt to some extent among the natives of the Gold Coast. A Danish mission was started at Christiansborg about 1736 by Protten and Huckoff, the Moravian brethren. In 1835 the Wesleyan mission began its labours among the Fanti. The Basel missionaries had made a start in 1823, but it was not till 1835 that they were fairly settled at Akropong, the capital of Aquapem. They now have stations also at Kyebi, at Kukurantimy, at Abune, at Abokoli, at Addah, and at Aca, and the leaders of the English expedition against the Ashantees speak very highly of their labours.

The climate of the Gold Coast is notoriously unhealthy. At Cape Coast Castle the thermometer ranges from 72° to 85° or 90°, and the amount of moisture in the atmosphere is very great. Not only are the coasts in many places lined with swamps and lagoons, but, according to Dr Gordon, the

<sup>1</sup> See an interesting paper by Captain Hay, "On the District of Akem in West Africa," in *Journ. Roy. Geogr. Soc.*, London, 1876.

<sup>2</sup> Adangme = Adan-gbe, i.e., Adah language, so called from the town of Ada or Addah on the Volta.

<sup>3</sup> This name appears in a great variety of forms—Kwi, Ekwi, Okwi, Oji, Odschi, Otsui, Tyi, Twi, Tshi, Tschii, Chwee, or Chee.

<sup>4</sup> See Rev. J. G. Christaller, *A Grammar of the Ashante and Fante Language called Tshi*, Basel, 1875.

<sup>5</sup> See D. L. Carr and F. P. Brown, *Mfantisi (i.e., Fanti) Grammar*, Cape Coast, 1868; Zimmermann, *Grammatical Sketch and Vocabulary of the Akra or Ga language*, Stuttgart, 1858; and *A Dictionary, English, Tshi, Akra*, by Christaller, Locher, and Zimmermann, Basel, 1874.

very basis rock of the country—a granite in which iron ore and hornblende are present—gives off under the influence of the air and the rain large quantities of sulphuretted hydrogen gas. The native towns are populous and dirty, and to add to the evil it was, until the prohibition of the British authorities (at Elmina by Colonel Festing, and at Cape Coast by Governor Strahan), the custom to bury the dead in the floors of the houses. Intermittent fevers, remittent fevers (the so-called coast fever is of this class), and dysentery are the diseases most to be dreaded by the European. "The native inhabitants," says Marcus Allen, "appear to enjoy tolerable health and to live to an average age; but in the rainy season it is not uncommon to find them suffering from pleuritis and pneumonia, rheumatic attacks, bronchitis, and catarrh."

Though the precious dust to which the Gold Coast owes its name is no longer obtained in any considerable quantities by the rude methods of collection employed by the natives, there is abundant proof that the whole region is more or less auriferous, and it is possible that European energy and skill might make it again a real gold coast. In some parts of the country—in the neighbourhood of the Volta, for example—the surface of the ground is broken by innumerable small pits dug by the native miners.<sup>6</sup> At present the value of the territory is mainly due to the profusion of vegetable products supplied by the rich alluvial soil. Of the timber trees which abound in the vast stretches of forest, the best known are several species of the genus *bombax* (silk cotton tree, &c.), from which canoes and wooden wares are manufactured, and the odium used for building and cabinet-work. The cocoa-nut and the palm oil are common along the coast, and the bread-fruit tree has been introduced with success at Napoleon. Indian corn, yams, cassava, sweet potatoes, tiger-nuts, ground-nuts (*Arachis hypogaea*), Guinea corn (*Sorghum vulgare*), Guinea grains (*Amomum grana-paradisi*), the egg-plant (*Solanum ovigerum*), bennie seed, oranges, limes, shaddock, pine apples, ginger, and indigo are some of the many objects of cultivation. Nor must the kola nut be forgotten (*Sterculia acuminata*), variously styled colat, khola, and in older writers gura or gourou; for it is the favourite substitute in Western Africa for the betel nut, and forms an important article of export. Both tobacco and cotton are indigenous, but neither is cultivated by the natives. Coffee and tobacco are grown by the missionaries at Akropong.

The exports are mainly gold dust, palm oil, and palm kernels; and the imports, in exchange, dry goods from the United Kingdom, and tobacco and spirits from America. In 1875 and 1876 the exports were respectively of the value of £327,012 and £465,268, and the corresponding imports amounted to £364,672 and £446,088. The revenue of the Gold Coast, mainly derived from customs duties, was £67,368 in 1875, and £64,788 in 1876; the corresponding expenditures were £67,368 for 1875, and £93,944 for 1876. There is no public debt.

The jurisdiction of England on the Gold Coast was defined by the bond of the 6th of March 1844, an agreement with the native chiefs by which Her Majesty receives the right of trying criminals and repressing human sacrifices, panyarring, &c. The limits of the protectorate inland were not very rigidly defined. The purchase of the Danish forts in 1851, and of the Dutch forts and territory in 1871, led to the consolidation of the British power along the coast; and the Ashantee war of 1873-74 resulted in the extension of the area of British influence towards the interior. By the royal ordinances of December 1874 the selling, buying, or dealing in slaves was declared unlawful, and no person can any longer be put in pawn for debt; but those who were actually slaves at that date are left in the same state, except where cruelty can be proved against the masters.

<sup>6</sup> See *The Golden Coast or a Description of Guiney, together with a*

<sup>6</sup> For many interesting details on the gold of the Gold Coast, see the chapter specially devoted to the subject in Burton's *Wanderings in West Africa*.

relation of such persons as got wonderful estates by their trade thither, London, 1665; James Horton, *Medical Topography of the West Coast of Africa*, London, 1859; *Physical and Medical Climate*, London, 1867, and *Letters on the Political Condition of the Gold Coast*, London, 1870; Otto Finsch, "Die Goldküste und ihre Bewohner in ihrem heutigem Zustande," in *Zeitsch. für allg. Erdkunde*, Berlin, 1864; *Wanderings in West Africa by a F.R.G.S. (i.e., Captain Burton)*, London, 1863; Marcus Allen, *The Gold Coast*, London, 1874; Charles A. Gordon, *Life on the Gold Coast*, London, 1874; Captain Croft, "Exploration of the River Volta," in *Proc. Roy. Geog. Soc.*, Lond., 1874; P. Wurm, "Anfänge der Basler Mission auf der Goldküste," in *Evangelisches Missions-Magazin*, 1874; E. Buhl, "Die Basler Mission auf der Goldküste," *Ibid.*, 1877. The following maps are of service:—J. Wyld, *Map of British Possessions on the Gold Coast*, London, 1873; *Die Goldküste nach den Arbeiten der Missionare A. Riis, &c.*, Basel and Stuttgart, 1873; and E. Stanford, *Map of the Gold Coast, &c.*, 1873.

GOLDEN BULL (Latin, *BULLA AUREA*) is, in general, the designation of any charter decorated with a golden seal or *bull*, either from the intrinsic importance of its contents, or from the rank and dignity of the bestower or the recipient. The custom of thus giving distinction to certain documents is said to be of Byzantine origin, though if this be the case it is somewhat strange that the word employed as an equivalent for golden bull in Byzantine Greek should be the hybrid χρυσόβουλλον (cf. Codinus Cuiropalates, *ὁ μέγας λογοθέτης διατάττει τὰ παρὰ τοῦ βασιλέως ἀποστελλόμενα προστάγματα καὶ χρυσόβουλλα πρὸς τὸν Ἔργατος, Σοῦλτανος, καὶ τοπάρχους*; and Anna Comnena, *Alexiad.*, lib. iii., *διὰ χρυσόβουλλον λόγον*; lib. viii., *χρυσόβουλλον λόγον*). In Germany a Golden Bull is mentioned under the reign of Henry I. in *Chronica Cassin.*, ii. 31, and the oldest German example, if it be genuine, dates from 983. At first the golden seal was formed after the type of a solid coin, but at a later date, while the golden surface presented to the eye was greatly increased, the seal was really composed of two thin metal plates filled in with wax. The number of golden bulls issued by the imperial chancery must have been very large; the town of Frankfort, for example, still preserves no fewer than eight. But the name has become practically restricted to a few documents of unusual political importance, the golden bull of the Empire, the golden bull of Brabant, the golden bull of Hungary, and the golden bull of Milan—and of these the first is undoubtedly the golden bull *par excellence*.

It was drawn up under the direction of the emperor Charles IV., and it was formally ratified in 1356,—the first twenty-three chapters by the diet of Nuremberg (10th January), and the remaining seven by the diet of Metz (25th December). The actual redaction has been assigned to Bartolus de Saxoferrato, to Rudolf of Friedberg the imperial secretary, and even to the emperor himself; but there is no distinct authority for any of the three hypotheses as opposed to the others. A brief statement of the general purpose of its enactments has already been given at page 495 of the present volume. The exordium is a strangely rhetorical lamentation over the miseries of division, and more especially of a kingdom divided against itself; and the body of the document gives a survey of the duties, privileges, and relations of the various dignitaries of the empire, the emperor, the electors ecclesiastical and secular, the electoral plenipotentiaries, and the officers of the court. As might almost be expected, a large place is given to rules of ceremony and etiquette. At first the document was known simply as the *Lex Carolina*; but by and by the name of the Book with the Golden Bull came into use, and the present elliptical title was sufficiently established by 1417 to be officially employed in a charter by King Sigismund. The original autograph was committed to the care of the electoral prince of Mainz, as chancellor-in-chief of the empire, and it was preserved in the imperial archives at Mainz till 1789. Official transcripts were probably furnished to each of the seven electors at the time of the pro-

mulgation, and before long many of the other members of the empire secured copies for themselves. The transcript which belonged to the elector of Treves is preserved in the state archives at Stuttgart, that of the elector of Cologne in the court library at Darmstadt, and that of the elector of Bohemia in the imperial archives at Vienna. Berlin, Munich, and Dresden also boast the possession of an electoral transcript; and the town of Kitzingen has a contemporary copy in its municipal archives. There appears, however, to be good reason to doubt the genuineness of most of these so-called original transcripts. But perhaps the best known example is that of Frankfort-on-the-Main, which was procured from the imperial chancery in 1366, and is adorned with a golden seal like the original. Not only was it regularly quoted as the indubitable authority in regard to the election of the emperors in Frankfort itself, but it was from time to time officially consulted by members of the empire.

The manuscript consists of 43 leaves of parchment of medium quality, each measuring about 10½ inches in height by 7½ in breadth. The seal is of the plate and wax type. On the obverse appears a figure of the emperor seated on his throne, with the sceptre in his right hand and the globe in his left; a shield, with the crowned imperial eagle, occupies the space on the one side of the throne, and a corresponding shield, with the crowned Bohemian lion with two tails, occupies the space on the other side; and round the margin runs the legend, *Karolus quartus divina favente clementia, Romanorum imperator semper Augustus et Boemia rex*. On the reverse is a castle, with the words *Aurea Roma* on the gate, and the circumscription reads, *Roma caput Mundi Regū orbis freno rotundi*. The original Latin text of the bull was printed at Nuremberg by Creussner in 1474, and a second edition by Koberger appeared at the same place in 1477. Since that time it has been frequently reprinted from various manuscripts and collections. Goldastus gave the Palatine text, compared with those of Bohemia and Frankfort, in his *Collectio Constitutionum Imperialium*, tom. i. Another is to be found in Onuphrius Panvinus, *De Comitibus Imperii*, and as an appendix to Cujacius, *De feudis*; and a third, of unknown history, is prefixed to the *Codex Recessuum Imperii*, printed at Mainz in 1599, and again in 1615. The Frankfort text appeared in 1742—*Aurea Bulla secundum exemplar originale Frankfurtense*—from the pen of Wolfgang Ch. Miltz. German translations, none of which, however, had any official authority, were published at Nuremberg, 1474(?); at Venice, Johannus Jenson, 1476; and at Strasburg, Joh. Preussen, 1485. Among the earlier commentators of the document are Buxtorf, Dominicus Arumæus, Martinus Rumelius, H. Caninius, G. T. Dietrich, Ostermann, Speidelius, and Limnaeus (*In Auream bullam*, Strasburg, 1662). The student will find a good account of the older literature of the subject in Biener, *Commentarii de origine et progressu legum Germanicarum*, 1787 (vol. ii.); and, besides the important work of Ohlen-schlager, *Neue Erläuterungen der Guldener Bulla*, Frankfurt and Leipzig, 1766, he may consult H. G. Thülemarius, *De bulla aurea argentea, &c.*, Heidelberg, 1682 (which gives the Frankfort text of the bull of Charles IV., a golden bull of Andronicus of Constantinople, the Bulla Brabantina, and the capitulation of Maximilian II.); Pütters, *Staatsverfassung des deutschen Reichs*, Göttingen, 1788; Pfister, *Geschichte der Deutschen*, Hamburg, 1831 (vol. iii.); and Stobbe, *Gesch. der Deutschen Rechtsquellen*, Brunswick, 1860. A learned article on "Goldene Bullen," by H. Brandes, will be found in Ersch and Gruber's *Encyclopädie*, 1861.

GOLDEN-EYE, a name indiscriminately given in many parts of Britain to two very distinct species of Ducks, from the rich yellow colour of their irides. The commonest of them—the *Anas fuligula* of Linnæus and *Fuligula cristata* of most modern ornithologists—is, however, usually called by English writers the Tufted Duck, while "Golden-eye" is reserved in books for the *A. clangula* and *A. glaucion* of Linnæus, who did not know that the birds he so named were but examples of the same species, differing only in age or sex; and to this day many fowlers perpetuate a like mistake, deeming the "Morillon," which is the female or young male, distinct from the "Golden-eye" or "Rattle-wings" (as from its noisy flight they oftener call it), which is the adult male. This species belongs to the group known as Diving Ducks, and is the type of the very well-marked genus *Clangula* of later systematists, which, among other differences, has the posterior end of the sternum prolonged



so as to extend considerably over, and, we may not unreasonably suppose, protect the belly—a character possessed in a still greater degree by the Mergansers (*Merginae*), while the males also exhibit in the extraordinarily developed bony labyrinth of their trachea and its midway enlargement another resemblance to the members of the same Subfamily. The Golden-eye, *C. glaucion* of modern writers, has its home in the northern parts of both hemispheres, whence in winter it migrates southward; but as it is one of the Ducks that constantly resorts to hollow trees for the purpose of breeding it hardly transcends the limit of the Arctic forests on either continent. So well known is this habit to the people of the northern districts of Scandinavia, that they very commonly devise artificial nest-boxes for its accommodation and their own profit. Hollow logs of wood are prepared, the top and bottom closed, and a hole cut in the side. These are affixed to the trunks of living trees in suitable places, at a convenient distance from the ground, and, being readily occupied by the birds in the breeding-season, are regularly robbed, first of the numerous eggs, and finally of the down they contain, by those who have set them up.

The adult male Golden-eye is a very beautiful bird, mostly black above, but with the head, which is slightly crested, reflecting rich green lights, a large oval white patch under each eye, and elongated white scapulars; the lower parts are wholly white and the feet bright orange, except the webs, which are dusky. In the female and young male, dark brown replaces the black, the cheek-spots are indistinct, and the elongated white scapulars wanting. The Golden-eye of North America has been by some authors deemed to differ, and has been named *C. americana*, but apparently on insufficient grounds. That country, however, has, in common with Iceland, a very distinct species, *C. islandica*, often called Barrow's Duck, which is but a rare straggler to the continent of Europe, and never, so far as known, to Britain. In Iceland and Greenland it is the only habitual representative of the genus, and it occurs from thence to the Rocky Mountains. In breeding-habits it differs from the commoner species, not placing its eggs in tree-holes; but how far this difference is voluntary may be doubted, for in the countries it frequents trees are wanting. It is a larger and stouter bird, and in the male the white cheek-patches take a more crescentic form, while the head is glossed with purple rather than green, and the white scapulars are not elongated. The New World also possesses a third and still more beautiful species of the genus in *C. albeola*, known in books as the Buff-headed Duck, and to American fowlers as the "Spirit-Duck" and "Butter-ball"—the former name being applied from its rapidity in diving, and the latter from its exceeding fatness in autumn. This is of small size, but the lustre of the feathers in the male is most brilliant, exhibiting a deep plum-coloured gloss on the head. It breeds in trees, and is supposed to have occurred more than once in Britain. (A. N.)

**GOLDEN FLEECE.** See ARGONAUTS.

**GOLDEN LEGEND.** See VORAGINE, JACOBUS DE.

**GOLDEN ROSE** (*rosa aurea*), an ornament, made of wrought gold and set with gems, which is blessed by the pope on the fourth (Lætare) Sunday of Lent, and usually afterwards sent as a mark of special favour to some distinguished individual, church, or civil community. The ceremonies which at present accompany the consecration of a golden rose are of a somewhat elaborate character, and are explained by liturgists as designed to make it specially emblematic of Christ and of the Christian graces. Some difficulty is experienced in tracing them to their ultimate origin; but the custom of blessing and sending some symbol of the kind seems to be as old at least as the time of Gregory the Great, with whom it was a frequent practice to

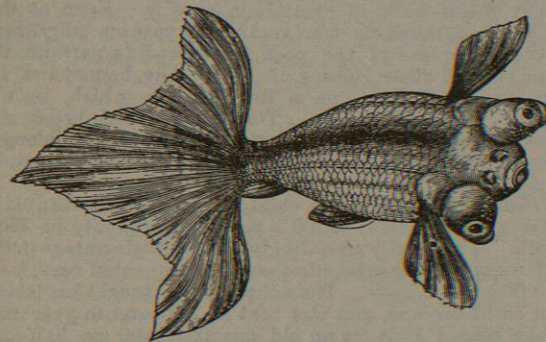
send persons whom he wished to flatter a few particles filed from "Peter's chains," and set in keys or crosses of gold (Greg., *Op.* ii. 648, 711, 796, 1031, ed. 1705). This practice continued to be observed for several centuries; thus we find Gregory VII., in 1079, writing to Alphonso of Castile, "Ex more sanctorum misimus vobis claviculam auream in qua de catenis beati Petri benedictio continetur" (Mansi, *Conc. Gen.*, xii. 460). The first mention of the "golden rose," as such, is said to occur in the 11th century; and an allusion to it is certainly made in the Chronicle of William of Newburgh (1197). Pope Urban V., who sent a golden rose to Joanna of Naples in 1366, is alleged to have been the first to determine that the consecration should be annually observed. Among the very numerous recipients of this honour have been Henry VIII. of England, the famous Gonsalvo de Cordova, and, in more recent times, Napoleon III. of France and Isabella II. of Spain. The gift of the golden rose used almost invariably to accompany the coronation of the king of the Romans. If in any particular year no one is considered worthy of the rose, it is laid up in the Vatican.

**GOLDFINCH** (German *Goldfink*), the *Fringilla carduelis* of Linnæus and the *Carduelis elegans* of later authors, an extremely well-known bird found over the greater parts of Europe and North Africa, and eastwards to Persia and Turkestan. Its gay plumage is matched by its sprightly nature; and together they make it one of the most favourite cage-birds among all classes. As a songster it is indeed surpassed by many other species, but its docility and ready attachment to its master or mistress makes up for any defect in its vocal powers. In some parts of England the trade in Goldfinches is very considerable. In 1860 Mr Hussey reported (*Zool.*, p. 7144) the average annual captures near Worthing to exceed 11,000 dozens—nearly all being cock-birds; and a witness before a Committee of the House of Commons in 1873 stated that, when a boy, he could take forty dozens in a morning near Brighton. In these districts and others the number has of late years become much reduced, owing doubtless in part to the fatal practice of catching the birds just before or during the breeding-season; but perhaps the strongest cause of their growing scarcity throughout the kingdom is the constant breaking-up of waste lands, and the extirpation of weeds (particularly of the Order *Compositæ*) essential to the improved system of agriculture; for in many parts of Scotland, East Lothian for instance, where Goldfinches were once as plentiful as Sparrows, they are now only rare stragglers, and yet there they have not been thinned by netting. Though Goldfinches may occasionally be observed in the coldest weather, incomparably the largest number leave Britain in autumn, returning in spring, and resorting to our gardens and orchards to breed, when the lively song of the cock, and the bright yellow wings of both sexes, quickly attract the notice of even the unobservant. The nest is a beautifully neat structure, often placed at no great height from the ground, but generally so well hidden by the leafy bough on which it is built as not to be easily found, until the young being hatched, the constant visits of the parents reveal its site. When the broods leave the nest they move into the more open country, and frequenting pastures, commons, heaths, and downs, assemble in large flocks towards the end of summer. Eastward of the range of the present species its place is taken by its congener *C. caniceps*, which is easily recognized by wanting the black hood and white ear-coverts of our own bird. Its home seems to be in Central Asia, but it moves southward in winter, being common at that season in Cashmere, and is not unfrequently brought for sale to Calcutta. The position of the genus *Carduelis* in the family *Fringillidae*

<sup>1</sup> The more common German name, however, is *Distelfink* (Thistle-Finch) or *Stieglitz*.

is not very clear. Structurally it would seem to have some relation to the Siskins (*Chrysomitris*), though the members of the two groups have very different habits, and perhaps its nearest kinship lies with the Hawfinches (*Coccothraustes*). See FINCH, vol. ix. p. 191. (A. N.)

**GOLDFISH** (*Carassius auratus*). In China and the warmer parts of Japan a fish extremely similar to the Crucian carp of Europe is of very common occurrence in ponds and other still waters. In the wild state its colours do not differ from those of a Crucian carp, and like that fish it is tenacious of life and easily domesticated. Albinos seem to be rather common; and as in other fishes (for instance, the tench, carp, eel, flounder), the colour of most of these albinos is a bright orange or golden yellow; occasionally even this shade of colour is lost, the fish being more or less pure white or silvery. The Chinese have domesticated these albinos for a long time, and by careful selection have succeeded in propagating all those strange varieties, and even monstrosities, which appear in every domestic animal. In some individuals the dorsal fin is only half its normal length, in others entirely absent; in others the anal fin has a double spine; in others all the fins are of nearly double the usual length. The snout is frequently



Goldfish (*Carassius auratus*).

malformed, giving the head of the fish an appearance similar to that of a bull-dog. The variety most highly prized at present has an extremely short snout, eyes which almost wholly project beyond the orbit, no dorsal fin, and a very long three- or four-lobed caudal fin (Telescope-fish). The gold-fish is now distributed over nearly all the civilized parts of the world. It was first brought to England in the year 1691, but was very scarce till 1728, when it was imported in great numbers from Holland, where the fish had already become domesticated. It will not thrive in rivers; in large ponds it readily reverts to the coloration of the original wild stock. It flourishes best in small tanks and ponds, in which the water is constantly changing and does not freeze; in such localities, and with a full supply of food, which consists of crumbs of bread, bran, worms, small crustaceans, and insects, it attains to a length of from 6 to 12 inches, breeding readily, sometimes at different times of the same year.

**GOLD HILL**, a town of Storey county, Nevada, United States, is situated at the head of a precipitous ravine of the Nevada mountains, 1 mile S. of Virginia city, and 328 E. from San Francisco by rail. The name was derived from a small hill connected with the famous Comstock lode, and containing rich golden ore. Some of the most valuable mines of this lode are within the limits of the town, the average yield being about two million dollars monthly in gold and silver. Though there are some quartz mills within the town, the greater part of the ore is conveyed to the mills on Carson river. There is a fine hall in connexion

with the miners' union, and another has been erected by the Oddfellows and Freemasons. The Methodists, Episcopalians, and Roman Catholics are the principal denominations of the town. Gold Hill obtains its water supply in conjunction with Virginia from the summit of the Sierra Nevada, 25 miles distant. The population in 1860 was 638, and in 1870 4311. Since then it has been rapidly increasing, and must have more than trebled its numbers.

**GOLDINGEN**, in Lettish *KULDIGA*, a district town of the Russian province of Courland, in 50° 58' N. lat. and 11° 58' E. long., 85 miles W.N.W. of Mittau, on the left bank of the Windau, which forms a beautiful waterfall—the Rummel—in the neighbourhood. On the Schlossberg or Castlehill are a few remains of the foundations of what in the end of the 18th century was the most magnificent ruin in Courland, and in the 17th century had been the palatial residence of the dukes. The town is beautifully built; and it possesses a Lutheran church dating from 1606, and a Catholic church five years older, a hospital and two almshouses, two benevolent societies, founded respectively in 1836 and 1839, and a society of rural economy. Brush-making is the only local industry of much importance. In 1861 the population was 5475 (2764 males), of whom the greater proportion were Lutherans, 1551 being Jews, 360 Roman Catholics, and 290 members of the Greek Church; but according to the *St Petersburg Calendar* for 1878 it has diminished to 4758. The castle of Goldingen was founded in 1249 by Dietrich of Gröningen, and in 1347 the town received its first charter of privileges from Goswin von Gerike, master of the Teutonic order. It has been a district town since 1795.

**GOLD LACE.** See under GOLD, p. 753.

**GOLDONI, CARLO** (1707–1793), the most illustrious of the Italian comedy-writers, and the real founder of modern Italian comedy. His life is known to us from his *Mémoires*, which, though they do not reveal a great thinker, are of great value as faithfully representing the Italian society, especially the Venetian society of the 18th century. Goldoni was born at Venice in 1707, in a fine house near St Thomas's church. His father Giulio was a native of Modena. The first playthings of the future writer were puppets which he made dance; the first books he read were plays,—among others, the comedies of the Florentine Cicognini. Later he received a still stronger impression from the *Mandragora* of Macchiavelli. At eight years old he had tried to sketch a play. His father, meanwhile, had taken his degree in medicine at Rome and fixed himself at Perugia, where he made his son join him; but, having soon quarrelled with his colleagues in medicine, he departed for Chioggia, leaving his son to the care of a philosopher, Professor Caldini of Rimini. The young Goldoni soon grew tired of his life at Rimini, and ran away with a Venetian company of players. He began to study law at Venice, then went to continue the same pursuit at Pavia, but at that time he was studying the Greek and Latin comic poets much more and much better than books about law. "I have read over again," he writes in his *Mémoires*, "the Greek and Latin poets, and I have told to myself that I should like to imitate them in their style, their plots, their precision; but I would not be satisfied unless I succeeded in giving more interest to my works, happier issues to my plots, better drawn characters, and more genuine comedy." For a satire entitled *Il Colosso*, which attacked the honour of several families of Pavia, he was driven from that town, and went first to study with the jurist-consult Morelli at Udine, then to take his degree in law at Modena. After having worked some time as clerk in the chanceries of Chioggia and Feltre, his father being dead, he went to Venice, to exercise there his profession as a lawyer. But the wish to write for the stage was always strong in