

yards, 52½ s.; 100 yards, 1 m. 7½ s.; 120 yards, 1 m. 28½ s.; 160 yards, 2 m. 2 s.; 200 yards, 2 m. 41½ s.; 220 yards, 2 m. 59½ s.; 400 yards, 5 m. 44½ s.; ½ mile, 6 m. 21½ s.; 500 yards, 7 m. 19½ s.; 600 yards, 8 m. 46½ s.; 800 yards, 11 m. 46½ s.; ¼ mile (21 turns), 13 m. ½ s.; 1000 yards, 14 m. 56½ s.; 1200 yards, 18 m. 5½ s.; ¾ mile, 20 m. ¾ s.; 1400 yards, 21 m. 17½ s.; 1 mile (43 turns), 27 m. 3½ s. The records of other baths include:—500 yards, 6 m. 55 s. (Oldham Baths); 100 yards, 1 m. 4½ s. (Blackburn Baths); 1 mile, 26 m. 21 s. (Westminster Aquarium) (80 turns).

Longest Time under Water, in Glass Tank.—4 m. 29½ s.

Longest Dives.—109 yards 2 feet 6 inches, and 113 yards 1 foot.

Longest Flumps.—From a springboard 5 feet above the level surface of the water, 75 feet 1 inch; from a fixed board, 3 feet 6 inches above the water level, 76 feet 3 inches.

For baths and bathing, see BATHS, vol. iii. p. 434. For drowning and rescuing life, see DROWNING, vol. vii. p. 475. There are two societies with headquarters in London which consist of delegates from nearly all the swimming clubs in the metropolis. These have framed rules and regulations for the conduct of clubs, races, and other performances included under "swimming." The Professional Swimming Association was successfully floated by Mr Robert Watson on July 6, 1881. The Amateur Swimming Association was reorganized in 1886 by the amalgamation of the Swimming Association of Great Britain and the Amateur Swimming Union. There are annual competitions for the amateur champion ships at 500 yards, ¼ mile, 1 mile in still water, and ½ miles in the Thames. There are also the Associated Swimming Clubs of Glasgow and the Associated Clubs of Dundee, each similar in its objects and composition to the Amateur Swimming Association.

The literature of the subject of swimming is considerable, and the following works may be mentioned. Thevenot, *The Art of Swimming*, transl. from the French, London, 1789; *Swimming*, two letters by Benjamin Franklin, Buzguy, 1791; Walker's *Mainly Sports*, art. "Swimming," London, 1836; G. H. Cliss, *Gymnastics and Swimming*, London, 1840; W. H. Leverall, *Swimming and Swimmers*, London, 1861; S. W. Higginson, "Swimming," in *The American and Continental Monthly*, May 1870; "Piscator," *How to Swim*, London, 1872; Charles Steedman, *Manual of Swimming*, London, 1873; Leahy, *Swimming in the Eton Style*, Nottingham, 1875; J. Bell Pettigrew, *Animal Locomotion*, London, 1874; W. Wilson, *Swimming, Diving, and How to Save Life*, Glasgow, 1876; Torkington, *Swimming Drill*, London, 1876; R. H. W. Dunlop, *Plate Swimming*, London, 1877; Menstery, *New Manual of Swimming*, New York, 1878; W. Wilson, *The Swimming Instructor*, 1883; J. H. Walsh, art. "Swimming," *British Rural Sports*, London, 1886.

**SWINDON.** The towns of Old and New Swindon, in Wiltshire, England, are situated on several railway lines, about 77 miles west of London and 30 east-north-east of Bath. The old town is built on an eminence commanding fine views of the surrounding country. It received a charter for a fair from Charles I., and has weekly markets for corn and cattle. The church was erected in 1851, from the designs of Sir Gilbert Scott. There is a town-hall and a corn exchange. Swindon New Town, to the north from Old Swindon, has grown up since the construction of the Great Western Railway, which has its principal works there. There is a market-house for meat, fish, and vegetables. Connected with the Great Western Railway mechanics' institution there is a library of about 14,000 volumes. The combined areas of Old and New Swindon, which form separate urban sanitary districts, amount to 2524 acres, with a population in 1881 of 22,374. Old Swindon (area 1214 acres) had a population in 1871 of 4092 and in 1881 of 4696, and New Swindon (area 1310 acres) a population in 1881 of 17,678.

**SWINE.** The oldest known even-toed or Artiodactyle Ungulates (see MAMMALIA, vol. xv. p. 429) were neither Oxen, Antelopes, Deer, Camels, nor Pigs, but presented a generalized type, which by modification in various directions has given rise to all these very diverse forms. They were mostly of small size, and had invariably the full number of teeth of the typical mammalian heterodont dentition, viz., 44, of which the incisors were 12 on each side, the canines 1, the premolars 4, and the true molars 27. The molars were short and square, crowned with blunt, rounded cusps, and the canines were not remarkably developed. All the feet terminated in four toes, the two middle ones (the third and fourth of the complete typical mammalian extremity) of nearly equal size, the outer ones (second and fifth) smaller, and also equal. The five-toed ancestor of these forms has not yet been discovered. They had no special weapons, as horns or antlers, on their foreheads. Such was the condition of all the hitherto discovered animals of this division at the commencement of the Tertiary period. Very early a change took place in the characters of the molar teeth in certain members of the group: the rounded tubercles became sharp ridges curved in a crescentic form, and better adapted for a purely herbivorous diet, especially for cutting and bruising the comparatively dry and hard blades of grass which grow

in open plains. The animals thus separated from the rest—the Selenodont (crescent-toothed) Artiodactyles—have undergone various further modifications of teeth, feet, and other parts, and constitute the diverse forms of ruminating animals mentioned above. Those whose molar teeth retained more of the primitive tuberculated (bunodont) form, were the ancestors of the present family of Swine, some of which, looking upon their organization as a whole, have undergone less change since the Eocene period than almost any other mammals.

Remains of very generalized swine-like animals have been abundantly found in Eocene and early Miocene formations both in America and Europe. In the former continent they never (as far as present evidence indicates) underwent any great diversity of modification, but gradually dwindled away and almost died out, being only represented in the actual fauna by the two closely-allied species of peccary, among the smallest and most insignificant members of the group, which have existed almost unchanged since the Miocene age at least, if the evidence of teeth alone can be trusted. In the Old World, on the other hand, the swine have played a more important part in recent times, having become widely distributed, and throwing off some curiously specialized forms. At the present time, though not very numerous in species, they range through the greater part of the Old World except within or near the Arctic Circle, although, in common with all the other members of the great Ungulate order, they were completely absent from the whole of the Australian region until introduced by man in very recent times.

The existing swine-like animals may be divided naturally into three families:—I. *Hippopotamidae*; II. *Suidae*, or true Pigs; III. *Dicotylidae*, or Peccaries.

#### I. FAMILY HIPPOPOTAMIDÆ.

*Muzzle very broad and rounded. Feet short and broad, with four subequal toes, with short rounded hoofs, all reaching the ground in walking. Incisors not rooted but continuously growing; those of the upper jaw curved and directed downwards; those of the lower straight and procumbent. Canines very large, curved, continuously growing; upper ones directed downwards. Premolars 4; molars 27. Stomach complex. No cæcum.*

This appears to be an exclusively Old-World form,—no animals belonging to it, either recent or fossil, having been found in America. The family has been divided into three genera, according to the number of the incisor teeth. (1) *Hexaprotodon*, incisors 6, a type which comes nearest to the generalized or ancestral form of the group, is now extinct, being only known from the early Pliocene formations of the Sub-Himalayan range. (2) *Hippopotamus* proper, incisors 2, contains the one well-known species *H. amphibius*, now confined to the rivers and lakes of Africa, but formerly (in the Pliocene period) abundantly distributed, under various minor modifications, in Europe, as far north as England. Remains of an allied form have been found in the island of Madagascar, where it is now extinct. (3) *Chæropsis*, incisors reduced to 2, contains one very small and still little known species, from rivers of Liberia, West Africa, *C. liberiensis*. See HIPPOPOTAMUS.

#### II. FAMILY SUIDÆ.

*An elongated mobile snout, with an expanded, truncated, nearly naked, flat, oval terminal surface in which the nostrils are placed. Feet narrow: four completely developed toes on each. Hoofs of the two middle toes with their contiguous surfaces flattened. The outer (second and fifth) digits not reaching to the ground in the ordinary walking position. Teeth variable in number, owing to the suppression in some forms of an upper incisor and one or more premolars.*

*Incisors rooted. Upper canines curving more or less outwards or upwards. Stomach simple, except for a more or less developed pouch near the cardiac orifice. A cæcum. Colon spirally coiled. Confined to the Old World.*

*Sus*.—Dentition:  $i \frac{3}{2}$ ,  $c \frac{1}{1}$ ,  $p \frac{1}{1}$ ,  $m \frac{3}{3}$ ; total 44. Upper incisors diminishing rapidly in size from the first to the third. Lower incisors long, narrow, closely approximated, and almost horizontal in position, their apices inclining towards the middle line; the second slightly larger than the first, the third much smaller.

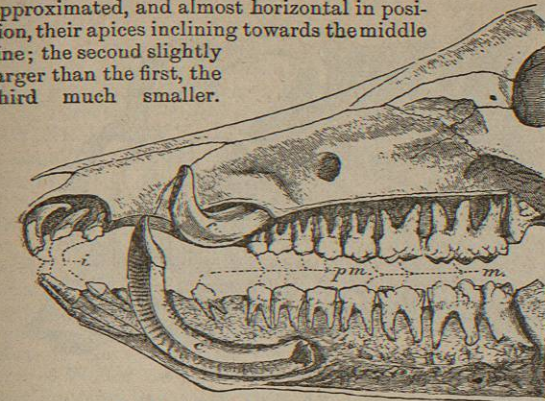


FIG. 1.—Dentition of Boar (*Sus scrofa*).

Canines strongly developed and with persistent roots and partial enamel covering, those of the upper jaw not having the usual downward direction, but curving strongly outwards, upwards, and finally inwards, while those of the lower jaw are directed upwards and outwards with a gentle backward curve, their hinder edges working and wearing against the front edges of the upper canines.<sup>1</sup> They appear externally to the mouth as tusks, the form of the upper lip being modified to allow of their protrusion, but are much less developed in the females than in the males. The teeth of the molar series gradually increase in size and complexity from first to last, and are arranged in contiguous series, except that the first lower premolar is separated by an interval from the second. First and second upper premolars with compressed crowns and two roots. The third and fourth have an inner lobe developed on the crown, and an additional pair of roots. The first and second true molars have quadrate crowns, with four principal obtuse conical cusps, around which numerous accessory cusps are clustered. The crown of the third molar is nearly as long (antero-posteriorly) as those of the first and second together, having, in addition to the four principal lobes, a large posterior talon or heel, composed of numerous clustered conical cusps, and supported by several additional roots. The lower molar teeth resemble generally those of the upper jaw, but are narrower. Milk dentition:  $i \frac{3}{2}$ ,  $c \frac{1}{1}$ ,  $m \frac{3}{3}$ ; total 28,—the first permanent premolar having no predecessor in this series. The third incisor, in both upper and lower jaw, is large, developed before the others, and has much the size, form, and direction of the canine. Vertebrae: C 7, D 13–14, L 6, S 4, C 20–24. The hairy covering of the body varies much under different conditions of climate, but when best developed, as in the European wild boar, consists of long stiff bristles, mostly abundant on the back and sides, and of a close softer curling under-coat.

<sup>1</sup> If from any accidental circumstances these teeth are not constantly worn down by friction, they grow into a complete circle, the point penetrating the bone of the jaw close to the root of the tooth. The natives of the Fiji Islands avail themselves of this circumstance to produce one of their most valued ornaments—a circular boar's tusk: the upper canines being extracted, the lower ones are allowed to grow to the desired form.

This genus occurs at present under three principal modifications or subgenera.

A. *Sus* proper comprises a number of animals found in a wild state throughout the greater part of Europe (except where exterminated by human agency), the north of Africa, southern continental Asia, and the great islands of the Malayan archipelago, Formosa, and Japan. The following among others have been admitted by zoologists as distinct species:—*Sus scrofa*, the wild boar of Europe, Asia Minor, and North Africa, once common throughout the British Isles; *S. sennarensis*, North-East Africa; *S. cristatus*, Hindustan; *S. vittatus*, Java, Borneo, Amboyna, Batchian; *S. barbatus*, Borneo; *S. papuensis*, New Guinea; *S. timorensis*, Timor and Rotti; *S. andamanensis*, Andaman Islands; *S. celebensis*, Celebes; *S. taivanus*, Formosa; *S. leucomystax*, Japan; *S. verrucosus*, Java, Borneo, Ceram. This list will give some idea of the geographical distribution of wild pigs, but it must be borne in mind that through the whole of this region, and in fact now throughout the greater part of the habitable world, pigs are kept by man in a domesticated state, and it is still an open question whether some of the wild pigs of the islands named above may not be local races derived originally from imported domestic specimens. In New Zealand a wild or rather "feral" race is already established, the origin of which is of course quite recent, as it is well ascertained that no animal of the kind ever lived upon the island until after its settlement by Europeans. Whether the various breeds of domestic pigs have been derived from one or several sources is still unknown. As in so many similar cases there is no historic evidence upon the subject, and the researches of naturalists, as Nathusius, Rutimeyer, Rolleston, and others, who have endeavoured to settle the question on anatomical evidence, have not led to satisfactory conclusions. It is, however, tolerably certain that all the species or forms of wild pigs enumerated above and all the domestic races are closely allied, and it is probable (though of this there has been no opportunity of proof)

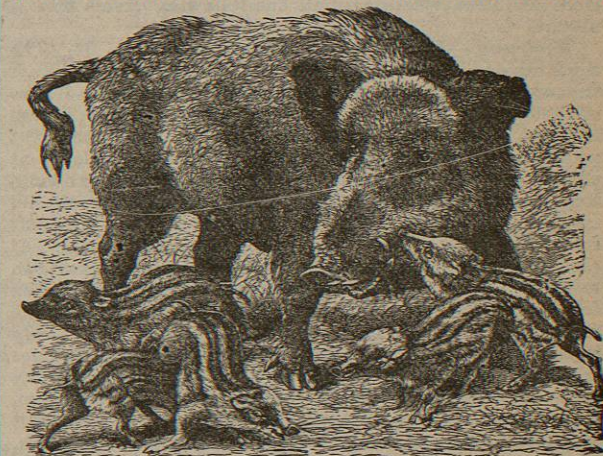


FIG. 2.—Wild Boar and Young.

will breed freely together. It is a curious circumstance that the young of all the wild kinds of pigs (as far as is known at present) present a uniform coloration, being dark brown with longitudinal stripes of a paler colour, a character which completely disappears after the first few months. On the other hand, this peculiar marking is rarely seen in domestic pigs in any part of the world, although it has been occasionally observed. It is stated by Darwin that the pigs which have run wild in Jamaica



and the semiferal pigs of New Granada have resumed this aboriginal character, and produce longitudinally striped young; these must of course be the descendants of domestic animals introduced from Europe since the Spanish conquest, as before that time there were no true pigs in the New World. Another character by which the European domestic pig differs from any of the wild species is the concave outline of the frontal region of the skull, a form still retained by the feral pigs in New Zealand.<sup>1</sup>

B. The diminutive pig of Nepal, the Terai, and Bhutan, *Sus salvanius*, has been separated from the rest by Hodgson under the generic name of *Porcula*, but all the alleged distinctive characters prove on more careful investigation to have little real value. Owing to its retired habits, and power of concealment under bushes and long grass in the depths of the great Saul Forest, which is its principal home, very little has been known of this curious little animal, scarcely larger than a hare. The recent acquisition of living specimens in the London Zoological Gardens has, however, afforded opportunities for careful anatomical observation.<sup>2</sup>

C. Two well-marked species of African swine have been with more reason separated under the name of *Potamochoerus*. The dentition differs from that of true *Sus*, inasmuch as the anterior premolars have a tendency to disappear; sometimes in adult specimens the first upper premolar is retained, but it is usually absent, as well as the first and often the second lower premolars. The molar teeth are also less complex; the last especially has a much less developed heel. There are also characteristic cranial differences. The two species are very distinct in outward appearance and coloration. One is *P. africanus*, the South African River-Hog, or Bosch-Vark, of a grey colour, and the other *P. porcus* or *penicillatus*, the West African Red River-Hog, remarkable for its vivid colouring and long pencilled ears. It should be noted that the young of both these species, as well as of the pigmy *S. salvanius*, present the striped character of true *Sus*, a strong indication of close affinities, whereas in all the following forms this is absent.

*Babirussa*.—Dentition:  $i \frac{2}{3}, c \frac{1}{1}, p \frac{2}{2}, m \frac{3}{3}$ ; total 34. The total number of teeth is therefore considerably reduced, the outer upper incisor and the two anterior premolars of both jaws being absent. The molars, especially the last, are smaller and simpler than in *Sus*, but the great peculiarity of this genus is the extraordinary development of the canines of the male. These teeth are ever-growing, long, slender, and curved, and entirely without enamel covering. Those of the upper jaw are directed upwards from their base, so that they never enter the mouth, but pierce the skin of the face, resembling horns rather than teeth, and curve backwards, downwards, and finally often forwards again, almost or quite touching the skin of the forehead. There is but one species, *B. alfurus*, found only in the islands of Celebes and Buru. Its external surface is almost entirely devoid of hair. With regard to the curiously modified dentition, Wallace (*Malay Archipelago*, i. p. 435) makes the following observations. "It is difficult to understand what can be the use of these horn-like teeth. Some of the old writers supposed that they served as hooks by which the creature could rest its head on a branch.

<sup>1</sup> The breeding of pigs has of late years been practised with more care and skill than formerly, especially in the United States, where the "hog product" ranks with wheat and cotton as one of the leading agricultural exports. Several volumes have been published of the pedigrees of two breeds—the Berkshire and the Poland-China. The official estimate of the number of swine in the United States in 1886 is 46,000,000, and about the same number is assigned unofficially to Europe, where Servia takes the lead in proportion to population and Norway stands lowest.

<sup>2</sup> See Garson, *Proc. Zool. Soc. Lond.*, 1883, p. 413.

But the way in which they usually diverge just over and in front of the eye has suggested the more probable idea, that they serve to guard these organs from thorns and spines while hunting for fallen fruits among the tangled thickets of rattans and other spiny plants. Even this, however, is not satisfactory, for the female, who must seek her food in the same way, does not possess them.

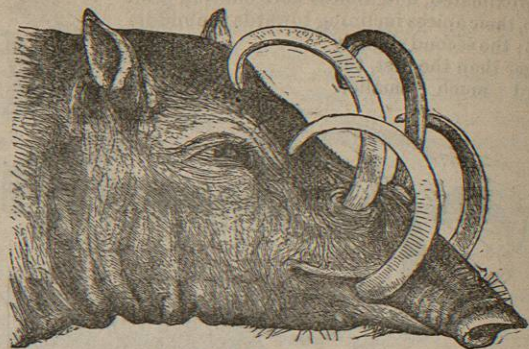


FIG. 3.—Head of Babirussa.

I should be inclined to believe rather that these tusks were once useful, and were then worn down as fast as they grew, but that changed conditions of life have rendered them unnecessary, and they now develop into a monstrous form, just as the incisors of the beaver and rabbit will go on growing if the opposite teeth do not wear them away. In old animals they reach an enormous size, and are generally broken off as if by fighting."

*Phacochoerus*.—The Wart-Hogs, so called from the large cutaneous lobes projecting from each side of the face, have the teeth still more remarkably modified than in *Babirussa*. The milk dentition, and even the early condition of the permanent dentition, is formed on the same general type as that of *Sus*, except that certain of the typical teeth are absent, the formula being  $i \frac{3}{3}, c \frac{1}{1}, p \frac{2}{2}, m \frac{3}{3}$ , total 34; but as age advances all the teeth have a tendency to disappear, except the canines and the posterior molars, but these, which in some cases are the only teeth left in the jaws, attain an extraordinary development. The upper canines especially are of great size, and curve outwards, forwards, and upwards. Their enamel covering is confined to the apex, and soon wears away. The lower canines are much more slender, but follow the same curve; except on the posterior surface, their crowns are covered with enamel. Unlike those of the babirussa, the canines of the wart-hog are large in both sexes. The third molar tooth of both jaws is of great size, and presents a structure at first sight unlike that of any other mammal, being composed of numerous (22–25) parallel cylinders or columns, each with pulp cavity, dentine, and enamel covering, and packed together with cement. Careful examination will, however, show that a similar modification to that which has transformed the comparatively simple molar tooth of the mastodon into the extremely complex grinder of the Indian elephant has served to change the tooth of the common pig into that of *Phacochoerus*. The tubercles which cluster over the surface of the crown of the common pig are elongated and drawn out into the columns of the wart-hog, as the low transverse ridges of the mastodon's tooth become the leaf-like plates of the elephant's.

Two species of this genus are distinguished:—*P. africanus*, Aelian's Wart-Hog, widely distributed over the continent; and *P. ethiopicus*, Pallas's Wart-Hog, confined to south-eastern Africa. In the latter species the dentition

reaches its most complete reduction, as in adult specimens the upper incisors are absent and the lower ones worn down to the roots

### III. FAMILY DICOTYLIDE.

*Snout as in Suida*. Dentition:  $i \frac{2}{3}, c \frac{1}{1}, p \frac{2}{2}, m \frac{3}{3}$ ; total 38. Incisors rooted: upper canines directed downwards, with sharp cutting hinder edges. Toes, four on the fore feet and three on the hind feet (the fifth wanting). Stomach complex. A cæcum. Confined to the New World.

There is one genus, *Dicotyles*, with two species, *D. tagacu*, the Collared Peccary, and *D. labiatus*, the White-lipped Peccary. See PECCARY. (W. H. F.)

SWINEMÜNDE, a Baltic port and bathing-place on the island of Usedom in Pomerania, Prussia, is situated at the mouth of the Swine, 35 miles to the north-west of Stettin. Its broad unpaved streets and one-story houses built in the Dutch style give it an almost rustic appearance, although its industries, beyond some fishing, are entirely connected with its shipping. The entrance to the harbour, one of the best on the Prussian Baltic coast, is protected by two long breakwaters, and is strongly fortified. Swinemünde lighthouse, 216 feet high, the loftiest in Germany, rises beside the new docks on the island of Wollin, on the other side of the narrow Swine. Ships drawing not more than 16 feet can proceed to Stettin, but those of heavier burden discharge or lighten at Swinemünde, which thus stands in the relation of a fore-port to the larger city, with which it is connected by railway. Exclusive of merely passing ships, 615 vessels with a burden of 189,491 tons entered and 607 vessels with a burden of 179,336 tons cleared the port in 1880. In 1882 it possessed a fleet of 39 vessels with a burden of 5218 tons. The population in 1880 was 8478.

The Swine, the central and shortest passage between the Stettiner Haff and the Baltic Sea, was formerly flanked by the fishing villages of West and East Swine. Towards the beginning of last century it was made navigable for large ships, and Swinemünde, which was founded on the site of West Swine in 1748, was fortified and raised to the dignity of a town by Frederick the Great in 1765. In 1775 it had 1000 inhabitants, in 1816 8191.

SWINTON, a town in the West Riding of Yorkshire, is situated at the junction of the Dearne and Dove navigation with the river Don navigation, and of the South Yorkshire and Midland railway lines, 9 miles north-east of Sheffield and 8 south-west of Doncaster. In the church of St Margaret (rebuilt in 1817) two beautiful Norman arches of the old church are preserved. There are collieries, quarries, and brickfields in the neighbourhood. A large number of persons are employed in the South Yorkshire Railway establishment for the repairing of engines and waggons. There are also flint and glass-bottle works, iron-works (for stoves, grates, fenders, and kitchen ranges), and earthenware manufactures. The town was formerly renowned for its Rockingham ware, but the manufacture has been discontinued for some years. A free warren was granted to Swinton by Henry II. King John, on his march from York to Boston, slept at Swinton old hall. The population of the urban sanitary district (area 1700 acres) in 1871 was 5150, and in 1881 it was 7612.

SWINTON, a large village of Lancashire, is situated on several railway lines, 5 miles north-west of Manchester and 6 south-east of Bolton. The Swinton industrial schools, opened in February 1846, are a fine range of buildings of brick with stone facings, surrounded with grounds extending to 20 acres. The church of St Peter, a fine building of stone with a lofty western tower, was erected from the designs of Sir Gilbert Scott in 1869. The manufacture of cotton and coal mining are the chief industries. Anciently a large part of Swinton was possessed by the Knights Hospitallers of St John of Jerusalem. Swinton

and Pendlebury form an urban sanitary district (area 2166 acres) under the government of a local board of twelve members; its population, estimated at 14,052 for 1871, amounted in 1881 to 18,107.

SWITHUN, St, bishop of Winchester from 852 to 862. The name of St Swithun, patron saint of Winchester cathedral from the 10th to the 16th century, is scarcely to be found in any contemporary document. His death is entered in the *Anglo-Saxon Chronicle* under the year 861; and his signature is appended to several charters in Kemble's *Codex Diplomaticus*. Of these charters three belong to 833, 838, and some year between 860 and 862. In the first the saint signs as "Swithunus presbyter regis Egberti," in the second as "Swithunus diaconus," and in the third as "Swithunus episcopus." Hence if the second charter be genuine the first must be spurious, and is so marked in Kemble.

More than a hundred years later, when Dunstan and Ethelwold of Winchester were inaugurating their church reform and supplanting the secular canons of the degenerate English foundations by monks, St Swithun was adopted as patron of the restored church at Winchester, formerly dedicated to St Peter and St Paul. His body was taken up from its almost forgotten grave outside the old monastery and translated to Ethelwold's new basilica on 15th July 971. Numerous miracles preceded and followed this translation. "We have seen," says one contemporary writer, "the precincts of the monastery so thronged with crowds of ailing folk that a traveller could scarcely make his way to the shrine; and yet, after some days, so numerous were the cures that even within the church itself there were scarcely five sick people to be seen." Another writer, likewise a contemporary, claims to the saint's credit two hundred cures in the short space of ten days.

The revival of St Swithun's fame gave rise to a mass of legendary literature, from which it can only be deduced that towards the end of the 10th century very little was known concerning his career. The so-called *Vita Swithuni* of Lantfred and Wulfstan, written about this time, hardly contain the very smallest kernel of biographical fact; and all that has in later years passed for authentic detail of St Swithun's life is extracted from a biography, ascribed with much probability to Gotzelin, a monk who came over to England with Hermann, bishop of Salisbury from 1058 to 1078. From this writer, who has perhaps preserved some fragments of genuine tradition, we learn that St Swithun was born in the reign of Egbert, and was ordained priest by Helmstan, bishop of Winchester (838-c. 852). His fame reached the king's ears, who appointed him tutor of his son Adulphus (Ethelwulf) and numbered him amongst his chief friends. Under Ethelwulf he was appointed bishop of Winchester, to which see he was consecrated by Archbishop Ceolnoth. In his new office he was remarkable for his piety and his zeal in building new churches or restoring old ones. At his request Ethelwulf gave the tenth of his royal lands to the church. His humility was such that he made his diocesan journeys on foot; and when he gave a banquet he invited the poor and not the rich. He built near the eastern gate of his cathedral city a bridge whose stone arches were so strongly constructed that in Gotzelin's time they seemed a work "non leviter ruiturus." He died 2d July 862, and gave orders that he was not to be buried within the church but outside in "a vile and unworthy place."

William of Malmesbury adds that, as Bishop Alhstan of Sherborne was Ethelwulf's minister for temporal, so St Swithun was for spiritual matters. The same chronicler uses a remarkable phrase in recording the bishop's prayer that his burial might be "ubi et pedibus pretereunium et stillicidius ex alto roantibus esset obnoxius." This expression has been taken as indicating that the well-known weather myth contained in the doggerel lines—

St Swithun's day if thou dost rain  
For forty days it will remain;  
St Swithun's day if thou be fair  
For forty days 'twill rain na mair—

had already, in the 12th century, crystallized round the name of St Swithun; but it is doubtful if the passage lends itself by any straining to this interpretation. Mr Raine has suggested that the legend is derived from the tremendous downpour of rain that occurred, according to the Durham chroniclers, on St Swithun's day, 1315 (*Hist. Dunelm.*, pp. xiii. 96–7). Another theory, more plausible, but historically worthless, traces it to a heavy shower by which, on the day of his translation, the saint marked his displeasure towards those who were removing his remains. This story, however, cannot be traced farther back than some two or three centuries after the outside, and is at variance with the 10th-century writers, who are all agreed that the translation took place in accordance with the saint's desire as expressed by vision. More probable is Mr Earle's suggestion that in the legend as now current



we have the survival of some pagan or possibly prehistoric day of angury, which has sheltered itself and preserved its vitality under the protection of an ecclesiastical saint. This view is supported by the fact adduced in *Notes and Queries* (1st ser., xii. p. 137) that in France St Médard (June 8) and St Gervase and St Protais (June 19) are accredited with an influence on the weather almost identical with that attributed to St Swithun in England. Mr Parker professes to detect a shower of rain as the symbol of St Swithun in the clog almanacs (of Queen Elizabeth's time), but Mr Earle doubts the resemblance. Of other stories connected with St Swithun the two most famous are those of the Winchester egg-woman and Queen Emma's ordeal. The former is to be found in Gotzelin's life (c. 1100), the latter in Rudborne's *Historia Major*

(15th century),—a work which is also responsible for the not improbable legend that this prelate accompanied Alfred on his visit to Rome in 856.

The so-called lives of St Swithun written by Wulfstan, Lanfrid, and perhaps others towards the end of the 10th century may be found in Bollandus's *Acta Sanctorum* (July), i. 321-327; Mabillon's *Acta SS. O. B.*, vi. 70, cc., vii. 628, cc.; and Earle's *Life and Times of St Swithun*, 59, &c. See also William of Malmesbury, *Gest. Reg.*, i. 159, and *De Gest. Pont.*, 169, 167, 179; Florence of Worcester, i. 168; Rudborne ap. Wharton's *Anglia Sacra*, i. 237; Hardy's *Cat. of MSS.*, i. 513-17; Brand's *Popular Antiquities*; Chamber's *Book of Days*; Ethelwulf's *Tithe Charters*, nearly all of which refer to St Swithun in the body of the text, may be studied in Haddan and Stubbs's *Councils*, iii. 636-45; a comparison of the charter on page 642 with Gotzelin's life (ap. Earle, 69) and William of Malmesbury (*Gest. Reg.*, 150; *De Gest. Pont.*, 100) seems to show that these charters, even if forgeries, date back at least to the 11th century, as well as the story of his being Ethelwulf's "altor et dactor."

## SWITZERLAND

### PART I.—GEOGRAPHY AND STATISTICS.

AS the Swiss Confederation consists of a number of small districts, differing from each other in many points, but gathered round a common centre, originally for common defence against a common foe, it is not surprising that its political boundaries do not coincide with those of nature. So we find that Ticino is south of the main chain of the Alps, a large part of the Grisons is east of the Rhine and of the ranges separating it from Tyrol, while Schaffhausen is north of the Rhine, and Porrentruy is in the French plain far down the western slope of the Jura. Putting aside these exceptional cases (all of them outside the original limits of the Confederation), the physical geography of Switzerland may be thus roughly summed up:—

(1) To the south there is the main chain of the Alps, which is joined at Mont Dolent (12,566 feet) by the lower ranges running east from the east end of the Lake of Geneva, and which continues to be the boundary up to the Stelvio Pass.

(2) To the north of this main chain of the Alps there is another great range, only slightly inferior in height and extent, which starts from the hills known as the Mont Jorat above Lausanne, rises in the great peaks of the Bernese Oberland and in the Todi, trends to the north near Chur, and, after rising once more to form the Säntis, dies away on the south shore of the Lake of Constance.

(3) The main chain of the Alps and this great north outlier are parallel to each other from Mont Dolent to near Chur; joined for a short space near the Pizzo Rotondo (west of the St Gotthard), they again part near the Oberalp Pass (east of the St Gotthard). Between these two great ranges flow two of the mightiest European rivers, the Rhine towards the east and the Rhone towards the west, their head waters being separated only by the tangled mountain mass between the Pizzo Rotondo and the Oberalp Pass.

(4) To the north of the great north outlier of the main chain of the Alps there are what may be called the plains of Switzerland, really the huge undulating valley of the Aar (and its affluents), to which must be added the Thur valley between the Aar basin and the Lake of Constance.

Thus, omitting the special cases named above, we may roughly describe Switzerland as consisting of two great trenches traversed by two great rivers, and enclosed by two huge mountain masses, together with the enormous valley of the Aar and the smaller one of the Thur, both these shut in by the great north outlier of the main chain of the Alps, the Rhine, and the Jura,—two deeply cut trenches, and two wide and undulating valleys.

The main chain of the Alps rises in Swiss territory to the height of 15,217 feet in Monte Rosa, and its north outlier to 14,026 feet in the Finsteraarhorn. The mean level of the Aar valley has been estimated at 1378 feet, its lowest point being the low-water mark of the Rhine at Basel (914 feet); the lowest level within the Confederation, however, is on the Lago Maggiore (646 feet).

According to the most recent calculations, the total area of the Confederation is 15,964.2 square miles, of which 71.7 per cent., or 11,443.3 square miles, are classed as "productive," 3032 square miles being covered by forests, and 132.3 square miles by vines. Of the other 28.3 per cent., or 4520.9 square miles (classed as "unproductive"),

709.9 are occupied by glaciers, 520.3 by lakes, 90 by beds of rivers and streams, and 62.4 by towns, villages, and buildings. Of the whole area the three great cantons of the Grisons, Bern, and Valais take up 7439.9 square miles, or nearly one-half, while, if to them be added Vaud, Ticino, and St Gall, the extent is raised to 10,552 square miles, or about two-thirds of the entire Confederation.

The total area of Switzerland (15,964.2 square miles) is distributed over four great river basins (draining to three different seas) in the following proportions:—Rhine, 11,166; Rhone, 2717; Po, 1358; and Inn, 721.

The Rhine basin is by far the largest in Switzerland, and drains of course to the North Sea. The Rhine itself is formed of two branches,—Vorder Rhine (valley of Dissentis) and Hinter Rhine (from the Splügen and St Bernardino),—which unite at Reichenau, near Chur. The joint stream receives several mountain torrents, expands into the Lake of Constance, and then turns west, receiving the Thur, and opposite Waldshut the great stream of the Aar, finally leaving Swiss territory at Basel, where it turns north. Its main affluent is the Aar, the basin of which covers no less than 6794 square miles. This stream rises in the glaciers of the Bernese Oberland, expands into the Lakes of Brienz and of Thun, receives from the left the Kander, the Saane, and the Zihl, and from the right the Emme, as well as (near Brugg, that great meeting-place of the waters) the Reuss flowing through the Lake of Lucerne and the united stream of the Linth and the Limmat flowing through the Lakes of Wallenstadt and Zürich. It is interesting historically to note the fact that the thirteen cantons which till 1798 formed the Confederation are all comprised in the Rhine basin, the ten oldest (i.e., all before 1500) being within that of the Aar, and that it was only after 1798 that certain Romansch, French, and Italian-speaking "allies" and subject lands—with their respective river basins—were tacked on. The Rhone rises in the glacier of the same name and flows west, receiving the mountain torrents of the Visp, the Lonza, and the Dranse, besides others, expands into the Lake of Geneva, and a little way from Geneva quits Swiss territory on its way to the Mediterranean. The main stream flowing from Switzerland to the Po basin is the Ticino (from the St Gotthard), which widens into the Lago Maggiore; another stream expands into the Lake of Lugano; and others run into the Lake of Como,—all finally joining the Po in the Lombard plains, thus draining to the Adriatic. The Ramm, flowing through the Münsterthal, joins the Adige and so drains into the Adriatic. The Inn basin is composed of the upper part of the river (above Martinsbruck) and drains into the Danube and so into the Black Sea.

Most of the great Swiss rivers, being in their origin mere mountain torrents, tend to overflow their banks, and hence much is required and has been done to prevent this by embanking them, and regaining arable land from them. So the Rhine (between Ragatz and the Lake of Constance), the Rhone, the Aar, the Reuss; and in particular we may mention the great work on the Linth (1807 to 1822) carried out by J. Konrad Escher, who earned by his success the surname of "Von der Linth," and on the Zihl near the Lakes of Neuchâtel and Bienné, while the diversion of the Kander from its junction with the Aar at Utendorf to a channel by which it flows into the Lake of Thun was effected as early as 1714.<sup>1</sup>

There are very many lakes in Switzerland. The two largest Lakes (Geneva and Constance) balance each other at the south-west and north-east corners of the Confederation. The following list gives details regarding the fifteen over 4 square miles in extent. It will be noticed that of these twelve are in the Rhine basin (seven of

<sup>1</sup> The hydrographic bureau of Switzerland publishes annually a series of graphic tables representing the seasonal changes in the volume of all the important rivers.

