

carried the necessary measures for the transfer of the government of Scotland to William and Mary. It declared in bolder terms than the English parliament that James had forfeited the crown and that the throne was vacant. The fifteen articles which contained the reasons for this resolution were included in a Declaration and Claim of Right,—a parallel to the English Declaration and Bill of Rights. Besides the declarations against the Papists with which it commenced—that no Papist could be king or queen, that proclamations allowing mass to be said, Jesuit schools and colleges to be erected, and Popish books to be printed were contrary to law—it detailed each of the unconstitutional acts of James and pronounced it contrary to law. This formidable list included imposing oaths without the authority of parliament; grants without the consent of parliament; employing officers of the army as judges throughout the kingdom; imposing exorbitant fines; imprisoning persons without expressing the reason, and delaying trials; forfeiture upon insufficient grounds, especially that of Argyll; the nomination by the king of the magistrates of burghs; sending of royal letters to courts of justice with reference to pending cases; granting protections for debt; forcing the lieges to depone against themselves in capital crimes; the use of torture without evidence in ordinary crimes; quartering of an army in time of peace upon any part of the kingdom; the use of law-burrows at the king's instance; putting garrisons in private houses in time of peace without the consent of the owners and of parliament; and fining husbands for their wives. It closed with asserting that Prelacy and the superiority of any office in the church above presbyters were insupportable grievances and ought to be abolished, and that it was the right and privilege of subjects to protest to parliament for "remeid" of law and to petition the king, and that for redress of grievances it was necessary parliament should frequently be called, with freedom of speech secured to members. As a conclusion from these premises the estates resolved that William and Mary should be declared king and queen of Scotland during their lives, but with the right of exercising regal power in William alone as long as he lived. After their death the crown was to pass to the heirs of the queen's body, and failing her to Anne of Denmark and her heirs, failing whom to the heirs of William. Commissioners were despatched to London to present the declaration and statement of grievances and take the royal oath to the acceptance of the crown on their terms. This was done at Whitehall in the following March (1689); but William, before taking the oath, required an assurance that persecution for religious opinion was not intended and made a declaration in favour of toleration.

His gov-  
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By desire of William the convention was superseded by a parliament which met in June; but, with the exception of an Act abolishing Prelacy, it transacted no business of importance. The parliament of 1690 was more fruitful. It abolished the committee of the Articles, which had become an abuse inconsistent with the freedom of parliament, and, while it retained a committee on motions and overtures in its place, declared that the estates might deal with any matter without referring it to this committee. The Act of Supremacy was rescinded. The Presbyterian ministers deposed since 1661 were restored and the Westminster Confession approved, though not imposed as a test except on professors. With more difficulty a solution was found for the question of church government. The Presbyterian Church was re-established with the Confession as its formula, and patronage was placed in the heritors and elders with a small compensation to the patrons. These prudent measures were due to the influence of Carstares, the chief adviser of William in Scottish ecclesiastical matters. He was not so well advised in the conduct of

the civil government by the Master of Stair, who became sole secretary for Scotland. The proclamation for calling out the militia may have been a necessary precaution, but it raised much opposition amongst the landed gentry, and the militia was not then embodied. The massacre of the Macdonalds at Glencoe by Campbell of Glenlyon was contrary to the spirit of the indemnity offered to the Highlanders. While the treachery with which it was executed may be attributed to Glenlyon, it was too plainly proved before the committee of inquiry which the Scottish parliament insisted on that it had been designed by Stair and Breadalbane, and, now that the whole documents have been published, it is also proved that it had been sanctioned by William. It was intended to strike terror; but its partial success was dearly bought, for it kept alive the Jacobite disaffection and gained for it much sympathy. The unfair treatment of the Scots in the matters of free trade and navigation, in which the new Government appeared to follow the policy of Charles rather than that of Cromwell, and acted with an exclusive regard to the prejudices and supposed interests of England, reached a climax in the abandonment of the Scottish settlement at Darien when attacked by the Spaniards. The over-sanguine hopes of Paterson and the Scottish colonists and capitalists who supported his enterprise, so suddenly transformed into a financial disaster overwhelming to a poor country, accompanied by the loss of many lives, embittered the classes on which the Revolution settlement mainly depended for its support. It was the anxious wish of William to have effected the legislative union; but, although he twice attempted it, the last time a month before his death, the temper of the English parliament and of the Scottish people appeared to give small chance of its realization.

9. *The Union and its Consequences.*—The reign of Anne, so far as it relates to Scotland, centred in the accomplishment of the union. In spite of the disparity of numbers, both nations now met to treat on equal terms. Still there were grave difficulties, and it required all the wisdom of the ministers of the early years of Anne, aided by the glory of Marlborough's arms, to overcome national prejudices and secure an object plainly for the benefit of both. The memories of Glencoe and Darien and the refusal of equal rights of trade led the Scottish parliament, the year after Anne's accession, to pass an Act of Security, by which, if the queen died without issue, the Scottish estates were to name a successor from the Protestant descendants of the royal line; but the successor to the English crown was expressly excluded unless there were "such conditions of government settled and enacted as may secure the honour and sovereignty of the crown and kingdom, the freedom, frequency, and power of parliament, the religious freedom and trade of the nation from English or any foreign influence." Political economy had not yet taught the reciprocal advantage of free trade, and the English jealousy of Scottish traders was intense. An incident about this time warned the English ministers that Scotland might easily revert to its old attitude of enmity. A Scottish ship of the African or Darien Company having been seized in the Thames at the suit of the English East India Company, the "Worcester," an English East Indiaman, was taken in the Forth by way of retaliation, and Green, its captain, with two other officers, was executed at Leith on a charge of piracy insufficiently proved. An attempt had been already made to complete the union by a commission, which sat from 10th November 1702 to 3d February 1705; but this miscarried through the refusal to grant free trade between the kingdoms. But again in 1705 the English parliament sanctioned the appointment of other commissioners, and new officers of state were nominated for Scotland with the express purpose of press-

ing the scheme forward in the Scottish parliament. Though opposed on contrary grounds by the Jacobites and the party of Fletcher of Salton, the Scottish ministry of Queensberry succeeded, by the aid of a third party nicknamed the "Squadron Volante," in getting the consent of parliament to the appointment of commissioners by the crown. The Act expressly excepted the church from the matters with which the commission was to deal. The commissioners, thirty-one from each country, met at Whitehall on 16th April and concluded their sittings on 23d July. The nomination by the crown had secured persons anxious to accomplish the union; experience had disclosed the cause of former failures, and the commissioners were guided by the statesmanship of Somers. It had been recognized from the first that the only settlement of the ecclesiastical question possible was to leave to each country its own church. It was wisely decided to treat the law and the courts in the same manner. These two subjects being removed from the scope of the treaty narrowed the debates to four main points,—the succession, trade, taxation, and the composition of the future parliament. The Scottish commissioners yielded on the first, the English on the second, and the remaining two were adjusted by a skilful compromise. The chief articles of the treaty were the settlement of both crowns according to the English Act of Succession on Anne and her descendants, and failing them on the electress Sophia and the Hanoverian line; the establishment of free trade between England and Scotland, and the admission of the Scots to equal privileges as regards trade with other countries; the national debt and taxation were adjusted by the imposition on Scotland of a moderate share (£48,000) of the land-tax, of which England was still to bear £200,000, and there was to be a uniform rate of custom and excise, Scotland being compensated by an equivalent of about £400,000 for becoming liable to a proportion of the English national debt, which already amounted to £16,000,000; forty-five representatives of Scotland were to be admitted to the House of Commons and sixteen elected peers to the House of Lords. Although the terms were on the whole favourable to Scotland, their announcement was received with dissatisfaction, especially in Edinburgh. The loss was immediate, from the abolition of an independent parliament, the reduction of the capital to a provincial town, and the increase of taxation to pay the growing national debt. The gain was in the future and in part doubtful. No one contemplated the rapid and enormous extension of trade. A proud people was unwilling to admit the advantage consequent upon free intercourse with a country in which wealth and civilization were more widespread. It had a natural attachment to its own institutions, though these were less popular than the English. It feared that, notwithstanding the most solemn guarantee, neither its church nor its laws could resist the influence of a country so much larger and more populous, in which henceforth was to be the sole seat of government, and that much of its wealth and talent would be attracted to the south and become English. The last parliament of Scotland was preceded by a stormy agitation against the union, and began its session with numerous addresses praying that the treaty should not be ratified, while none were presented in its favour. The popular feeling was embodied in the speeches of Lord Belhaven from a sentimental and patriotic point of view, and of Fletcher of Salton, who represented the democratic or republican element latent in a portion of the nation. But common sense aided by ministerial influence prevailed. The vote on the first article was prudently taken with a proviso that it was to be dependent on the rest being carried, but it really decided the fate of the measure. The Government commanded a large majority of the peers,

perhaps more amenable to influence. They were accused by the Jacobites of being bribed, but the sums received in name of payment of arrears of pension and of debts were too small to justify the charge. The lesser barons or county members and the representatives of the burghs were nearly equally divided; but there was a majority of four of each of these estates in favour of the article. The whole estates voted together and the total majority was thirty-five. This was increased when the last vote was taken to 41, the numbers being 110 for and 69 against, and the Act of Ratification to take effect from 1st May 1707 was carried. The Presbyterian Church received an additional guarantee in an Act passed for "securing the Protestant religion and the Presbyterian Establishment."

In the English parliament there was less serious opposition, proceeding chiefly from the High Church party, which was conciliated by an Act for the security of the Church of England. On 6th March 1707 the Scottish and English Acts ratifying the union received the royal assent.

Two Acts of the British parliament naturally followed the Act of Union. The Scottish privy council was abolished in 1708. A secretary of state for Scotland continued until 1746 to manage the Scottish department in London; but the lord advocate, the adviser of the crown on all legal matters both in London and Edinburgh, gradually acquired a large, and after the suppression of the office of the Scottish secretary a paramount influence in purely Scottish affairs, though he was nominally a subordinate of the home secretary.<sup>1</sup> In 1709 the law of treason was assimilated to that of England, being made more definite and less liable to extension by construction in the criminal courts. In the later years of Anne, when after the fall of Marlborough power passed from the Whig to the Tory party, two statutes were passed of a different character. Patronage was restored in the Presbyterian Church notwithstanding the protests of the assembly, and proved a fertile source of discord. A limited toleration Act in favour of the Episcopalians, permitting them to worship in private chapels, was opposed by the Presbyterians but carried.

With the union of the parliaments Scotland lost its legislative independence. Its representation in the British parliament for more than a century, based on the freehold franchise in the counties and in the burghs controlled by town councils, which were close corporations, was a representation of special classes and interests rather than of the nation. It almost appeared as if the prophecy of Belhaven would be accomplished and there would be an end of an old song. But Scottish history was not destined yet to end. The character of the people, though their language and manners gradually became more like those of England, remained distinct. They retained a separate church and clergy. Independent courts and a more cosmopolitan system of law opened a liberal profession and afforded a liberal education to youthful ambition. A national system of parish schools, burgh schools, and universities, though inadequately endowed and far from reaching the ideal of Knox and Melville, gave opportunities to the lower as well as the higher classes of receiving at a small cost an education suited for practical uses and the business of everyday life. The Scot had been from the earliest times more inclined to travel, to migrate, to colonize than the Englishman, not that he had a less fervent love of home, but a soil comparatively poor made it necessary for many to seek their fortune abroad. This tendency which had led Scottish monks, soldiers, and professors to embrace foreign service, now found new openings in trade, commerce, colonial enterprise in America, the East, and the West Indies, in the southern hemisphere and the exploration of unknown parts

<sup>1</sup> In 1885 a secretary for Scotland was again appointed with a separate office at Dover House, London.

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Other  
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of the globe. Accustomed to poverty, Scottish emigrants acquired habits of frugality, industry, and perseverance, and were rewarded by success in most of their undertakings. Nor, if war be regarded as necessary to the continued existence of a nation, was it altogether absent, but the cause with which the name of Scotland became identified was the losing one. The two rebellions proved the devoted loyalty which still attached many of the Highland clans, the Catholics, and some of the Episcopalians to the descendants of the Stuarts. But that in 1715, preceded by an abortive attempt in 1708, was put down by a single battle; Sheriffmuir, if it could scarcely be claimed as a victory by Argyll, led to the speedy dispersal of the clans which had gathered round the standard of Mar. Thirty years later the romantic rising of the Highlanders under the Young Pretender found the Government unprepared. Once more for a brief space Holyrood was a royal court. The defeat of Cope at Prestonpans and the rapid march of the Scottish army, slightly reinforced by Catholics from the northern and midland shires of England, to Derby, by which it cut off the duke of Newcastle's forces from the capital, made London tremble. Divided counsels, the absence of any able leader, and the smallness of their number (not more than 5000) prevented the daring policy of attacking London, which Charles himself favoured, and a retreat was determined on. It was skilfully effected, and on 26th December the little army, which had left Edinburgh on 31st October and reached Derby on 4th December, arrived in Glasgow. It was not favourably received, the south-west of Scotland being the district least inclined to the Stuarts, and it marched on Stirling to assist Lord John Drummond and Lord Strathallan, who had commenced its siege, which General Hawley threatened to raise. His defeat at Falkirk was the last success of the Jacobites. The duke of Cumberland was sent to command the royal forces, and Charles Edward was forced by Lord George Murray and the Highland chiefs to abandon the siege of Stirling and retreat to Inverness. He was at once pursued by the duke, and his defeat at Culloden (16th April 1746) scattered his followers and compelled him to seek safety in flight to the Hebrides, from which, after five months' wanderings, he escaped to France. The last rebellion within Great Britain was put down with severity. Many soldiers taken in arms were shot and no consideration was shown to the wounded. The chief officers and even some privates taken prisoners were tried and executed at various places in the north of England. The earls of Cromarty and Kilmarnock and Lord Balmerino were reserved for the judgment of their peers in London, and having pleaded guilty were beheaded at Tower Hill. The crafty Lovat, who had avoided appearing in arms, but was really at the bottom of the rising, though he pretended to serve both sides, was the last to suffer. An Act of indemnity was passed a few weeks after his execution. But effective measures were taken to prevent any renewal of the rebellion. The estates and titles of all who had been privy to it were forfeited. An Act was passed prohibiting the use of arms and the Highland dress; and the abolition of the military tenure of ward-holding, unfortunately preserved at the union, rooted out the remnants of feudal and military power till then left in the hands of the nobles and chiefs. These changes in the law had the willing consent of the Lowland and burghal population in Scotland, to whom the lawless and freebooting habits of the Highlanders had been a cause of frequent loss and constant alarm. Somewhat later the masterly policy of Pitt enlisted the Scottish Celts in the service of the crown by forming the Highland regiments. The recollection of Glencoe and Culloden was forgotten after the common victories of the British arms in India, the Peninsula, and Waterloo. In one direction the Jacobite cause survived

its defeat. Poetry seized on its romantic incidents, idealized the young prince who at least tried to win his father's crown, satirized the foreign and German, the Whig and Covenanting, elements opposed to the Stuart restoration, and substituted loyalty for patriotism. Self-sacrifice and devotion to a cause believed right, though deserted by fortune (qualities rare amongst the mass of any nation), dignified the Jacobites like the cavaliers with some of the nobler traits of chivalry, and the Jacobite ballads have their place in literature as one of the last expiring notes of mediæval romance. Music and tradition fortunately preserved their charm before the cold hand of history traced the sad end of Charles Edward, the pensioner of foreign courts, wasting his declining years in ignoble pleasures. It might be hard to say whether the first Hanoverians or the last Stuarts least deserved that men should fight and die for them; but the former represented order, progress, civil and religious liberty; the latter were identified with the decaying legend of the divine right of kings and the claim of the Roman Church not merely to exclusive orthodoxy but to temporal power and jurisdiction inconsistent with the independence of nations and freedom of conscience. Although a larger minority in Scotland than in England clung to the traditions of the past, an overwhelming majority of the nation, including all its progressive elements, were in favour of the new constitution and the change of dynasty.

During the remaining half of the 18th century and the commencement of the 19th a period of prosperity was enjoyed by Scotland, and the good effects of the union, intercepted by the rebellions, became visible. The Scottish nation, without losing its individuality, was stimulated by contact and friendly rivalry with its English neighbour in the arts of peace. It advanced in intellectual as well as material respects more than in any part of its previous history. It became, through commerce, manufactures, and improved agriculture, a comparatively rich instead of a poor country. Skilful engineering made the Clyde a successful competitor with the Thames and the Mersey, and Glasgow became one of the most populous cities in Great Britain. The industrial arts made rapid progress, and the fine arts began to flourish. The art of saving capital and using it as a source of credit was reduced to a system. Banks, not unknown in other countries and at an earlier date, are in their modern form a Scottish invention. Besides those which sprang up in Scotland itself, the national banks of England and France owed their origin to two Scotsmen. A safe system of life insurance represented the provident habits and business talents of the nation. Adam Smith shares with the French economists the honour of founding political economy as the science of the wealth of nations. Mental philosophy became a favourite study, and a distinctively Scottish school produced thinkers who deeply influenced the later systems of the Continent. The history not of Scotland only but of England and some portions of that of Europe were written by Scotsmen in works equal to any existing before Gibbon. The dawn of the scientific era of the 19th century was foreshadowed by Scottish men of science, the founders of modern geology, chemistry, anatomy, physiology, and the practice of medicine. In Scotland was made the first of the great line of discoveries in the practical application of science by the use of steam as a motive-power. The same period—so varied were its talents—gave birth to two Scottish poets, of world-wide fame. Burns expressed the feelings and aspirations of the people; Scott described both in verse and prose their history and the picturesque scenes in which it had been transacted. During the last half-century the material progress continued, but the intellectual was too brilliant to last. The preponderating influence of England even threatened to extinguish native Scottish genius by centralizing the political and social life of the island in the English capital. Only two changes of importance occurred. The political institutions of Scotland were reformed by a series of Acts which placed the franchise on a broader basis and made the representation of the people real. The Established Church, already weakened by secessions, was further divided by a disruption largely due to the ignorance of political leaders as to the deep-seated aversion of the nation to any interference with the independence of the church, especially in matters of patronage. Educational reform has also in recent years raised the standard of the universities and schools without injuring their popular character. While it would be incorrect to say that Scotland has had no independent history since the union, that history must be chiefly read in the annals of its church, its law, and its literature. Its political existence has been absorbed in that of Great Britain. (Æ. M.)



## PART II.—PHYSICAL FEATURES.

Scotland forms the northern portion of Great Britain and is divided from England by the rivers Sark, Liddell, and Kershope (an affluent of the Liddell), the Cheviot Hills, the river Tweed, and the liberties of Berwick. The mainland lies between  $58^{\circ} 40' 30''$  (at Dunnet Head, Caithness) and  $54^{\circ} 38' N.$  lat. (Mull of Galloway) and  $1^{\circ} 45' 30''$  (Peterhead) and  $6^{\circ} 14' W.$  long. (Ardnamurchan Point, Argyllshire). Including the islands, the extreme N. lat. is  $60^{\circ} 51' 30''$  (Outsack, Shetland) and the extreme W. long.  $8^{\circ} 35' 30''$  (St Kilda). Its greatest length from north to south, from Durness in Sutherland to Burrow Head in Wigtownshire, is 272 miles, and the greatest breadth from east to west, from Peterhead in Aberdeenshire to Applecross in Ross-shire, is 155, while the narrowest part, from Grangemouth in Stirlingshire to Bowling in Dumbartonshire, is only  $30\frac{1}{2}$  miles wide. The total area in 1881, according to the Ordnance Survey, was 19,777,490 acres or 30,902 square miles, —the area of foreshore being 310,413 acres or 485 square miles, of water 403,846 acres or 631 square miles, and of land-surface 19,063,231 acres or 29,786 square miles. But of the water area the acreage included under lakes and rivers respectively has not been ascertained.

## GEOLOGY.

In the article GEOLOGY (vol. x.) descriptions will be found of most of the geological formations of Scotland. All that need therefore be inserted here is a succinct summary of these formations with references to the pages of that article where fuller details are given.

Archean  
rocks.

The oldest rocks of Scotland and of the British Islands, known as Archean, consist chiefly of gneiss (Fundamental, Lewisian, Hebridian), which varies from a coarsely crystalline granitoid mass to fine schist. The coarse varieties are most abundant, intermingled with bands of hornblende-rock, hornblende-schist, pegmatite, eurite, mica-schist, sericite-schist, and other schistose accompaniments. In a few places limestone has been observed. No trace of any organism has ever been detected in any of these rocks. Over wide areas, particularly on the mainland, the bands of gneiss have a general north-west trend and undulate in frequent plications with variable inclination to northeast and south-west. The largest tract of Archean rock is that which forms almost the whole of the Outer Hebrides, from Barra Head to the Butt of Lewis. Other areas more or less widely separated from each other run down the western parts of Sutherland and Ross, and are probably continued at least as far as the Island of Rum. How far Archean rocks reappear to the east of this western belt has not yet been ascertained.

Above the Archean gneiss lies a series of red and chocolate-coloured sandstones, conglomerates, and breccias (Cambrian or Torridon sandstone), which form a number of detached areas from Cape Wrath down the seaboard of Sutherland and Ross, across Skye, and as far as the Island of Rum (GEOLOGY, vol. x. p. 330). They rise into prominent pyramidal mountains, which, as the stratification is usually almost horizontal, present in their terraced sides a singular contrast to the neighbouring heights, composed of highly plicated crystalline schists. In the Torridon district these sandstones can be seen towering bed above bed to a height of about 4000 feet, and their thickness is still greater. They have not yet yielded any recognizable fossil; their geological age is accordingly doubtful, though from their relation to the overlying fossiliferous rocks and from their own lithological characters they have with much probability been classed with the Cambrian system of Wales. They are not met with anywhere else in Scotland than in the north-west Highlands.

Rocks belonging to the Silurian system occur in two distinct regions and in two very strongly contrasted conditions. They constitute nearly the whole of the southern uplands (GEOLOGY, vol. x. pp. 333, 337). In that belt of country they consist for the most part of greywacke, grit, shale, and other sedimentary rocks, but in the south-west of Ayrshire they include some thick lenticular bands of limestone. They have been thrown into many plications, the long axes of which run in a general north-easterly direction. It is this structure which has determined the trend of the southern uplands. The plications of the Highlands and the chief dislocations of the country have followed the same general direction, and hence the parallelism and north-easterly trend of the main topographical features. Abundant fossils in certain parts of the Silurian rocks have shown that representatives of both the Lower and Upper divisions are present. By far the larger part of the uplands belongs to the former. The Upper Silurian shales and sandstones appear only along the northern and southern margins.

In the north-west Highlands the Cambrian red sandstones are overlain unconformably by several hundred feet of white quartzite with annelid tubes, followed by fossiliferous limestones and shales (GEOLOGY, vol. x. p. 333). The abundant fossils in these strata prove them to be of Lower Silurian age. It was believed by Murchison that, as these Silurian strata dip conformably below various schists which spread eastwards into the rest of the Highlands, they demonstrate the crystalline rocks of the Highlands to

be of later than Silurian age. Recently, however, the structure of Sutherland has been investigated anew with minute care and the result is to show that the schists believed to overlie the Silurian strata conformably have been really pushed over them and consist in part of the Archean gneiss. It has been ascertained that from the mouth of Loch Erriboll on the north coast of Sutherland southwards to the Isle of Skye, a distance of more than 100 miles, a gigantic system of earth-movements has taken place, whereby the Silurian, Cambrian, and Archean rocks have been crumpled, inverted, dislocated, and have pushed over each other. In some places the horizontal displacement of these shifted masses has been not less than 10 miles. So intense has been the shearing of the rocks that their original structure has in many places been entirely destroyed. They have acquired a new schistosity, which is in a general sense parallel with the bedding of the Silurian rocks to the west of the line of disturbance. Hence the apparent conformability of the schists overlying these rocks. The total thickness of recognizable Silurian strata is about 2000 feet. The rocks that overlie them to the east of the line of disturbance in Sutherland and Ross are fine flaggy schists, quite unlike any part of the Archean gneiss and often strangely suggestive of altered sandstones. What are their true age and history remains still to be determined. There can be no doubt, however, that they have acquired their present schistosity since the Lower Silurian period, and hence that the present condition of the metamorphic rocks of the central Highlands does not go back to Archean time. That portions of the Archean series may have been pushed up in different parts of the Highlands is quite conceivable. But that much of the Highlands consists of altered sedimentary rocks like those of the Silurian uplands admits of no question. The solution of this difficult but interesting problem has the most important bearing upon the theory of metamorphism, but it can only be attained by patient and laborious mapping of the ground such as is being prosecuted by the Geological Survey.

As Scotland is the typical European region for the Old Red Sandstone a full account of this series of rocks has already been given in the article GEOLOGY (vol. x. pp. 343, 344). These rocks are grouped in two divisions, Lower and Upper, both of which appear to have been deposited in lakes. The Lower, with its abundant intercalated lavas and tuffs, extends continuously as a broad belt along the northern margin of the midland valley, reappears in detached tracts along the southern border, is found again on the south side of the uplands in Berwickshire and the Cheviot Hills, occupies a tract of Lorne in Argyllshire, and on the north side of the Highlands underlies most of the low ground on both sides of the Moray Firth, stretches across Caithness and through nearly the whole of the Orkney Islands, and is prolonged into Shetland. The Upper Old Red Sandstone covers a more restricted space in most of the areas just mentioned, its chief development being on the flanks of the north-eastern part of the southern uplands, where it spreads out over the Lammermuir Hills and the valleys of Berwickshire and Roxburghshire.

The areas occupied by Carboniferous rocks are almost entirely restricted to the midland valley, but they are also to be found skirting the southern uplands from the mouth of the Tweed to that of the Nith. The subdivisions of this important system, its coal-fields and igneous rocks, have been described in the article GEOLOGY (vol. x. pp. 346, 348, 349).

Rocks assignable to the Permian system occupy only a few small areas in Scotland. Extending from Cumberland under the Solway Firth, they fill up the valley of the Nith for a few miles north of Dumfries, and, reappearing again in the same valley a little farther north, run up the narrow valley of the Carron Water to the Lowther Hills. Other detached tracts of similar rocks cover a considerable space in Annandale, one of them ascending the deep defile at the head of that valley. Another isolated patch occurs among the Lead Hills; and lastly, a considerable space in the heart of the Ayrshire coal-field is occupied by Permian rocks. Throughout these separate basins the prevailing rock is a red sandstone, varied in the narrow valleys with intercalated masses of breccia (GEOLOGY, vol. x. p. 351). There can be no doubt that the valleys in which these patches of red rocks lie already existed in Permian time. They seem then to have been occupied by small lakes or inlets, not unlike fjords. Numerous amphibian tracks have been found in the red sandstone of Annandale and also near Dumfries, but no other traces of the life of the time. One of the most interesting features of the Scottish development of the Permian system is the occurrence of intercalated bands of contemporaneously erupted volcanic rocks in the Carron Water, Nithsdale, and Ayrshire. The actual vents which were the sites of the small volcanoes still remain distinct, and the erupted lavas form high ground in the middle of Ayrshire.

The Triassic system appears to be only feebly represented in Scotland. To this division of the geological record are assigned the yellow sandstones of Elgin, which have yielded remains of reptiles.

Triassic.

XXI. — 66