geological date. They comprise a consecutive series of deposits from the bottom of the Lias up to the Oxford Clay. The Lower, Middle and Upper Lias consist chiefly of shales and shelly limestones, with some sandstones, well seen along the shores of Broadford Bay in Skye and in some of the adjacent islands. The Lower Oolites are made up of sandstones and shales with some limestones, and are overlaid by several hundred feet of an estuarine series of deposits consisting chiefly of thick white sandstones, below and above which lie shales and shelly limestones. These rocks form a prominent feature under­neath the basalt terraces of the east side of Skye, Raasay and Eigg. They form the highest members of the Jurassic series, representing probably some part of the Oxford Clay. The next Secondary rocks (Cretaceous) succeed them unconformably.

*Cretaceous.—*Rocks belonging to the Cretaceous system at one time covered considerable areas on both sides of the Highlands, but they have been entirely stripped off the eastern side, while on the western they have been reduced to a few fragmentary patches, which have survived because of the overlying sheets of basalt that have protected them. Some greenish sandstones containing recognizable and characteristic fossils are the equivalents of the Upper Greensand of the south of England. These rocks are found on the south and west coasts of Mull and on the west coast of Argyllshire. They are covered by white sandstones and these by white chalk and marly beds, which represent the Upper Chalk of England. Their existence under the basalt outlier of Ben Iadain in Morven, at a height of 1600 ft. above the sea, shows notably how extensively they have been denuded, but also over how large a portion of the Western Highland seaboard they may have spread. They are a prolongation of the Cretaceous deposits of Antrim (Ireland). Enormous numbers of flints and also less abundant fragments of chalk are found in glacial deposits bordering the Moray Firth. These transported relics show that the Chalk must once have been in place at no great distance, if indeed it did not actually occupy part of Aberdeenshire and the neighbouring counties.

*Older Tertiary.*—Above the highest Secondary rocks on the west coast come terraced plateaus of basalt, which spread out over wide areas in Skye, Eigg, Mull and Morven, and form most of the smaller islets of the chain of the inner Hebrides. These plateaus are composed of nearly horizontal sheets of basalt—columnar, amorphous or amygdaloidal—which, in Ben More, in MuH, attain a thickness of more than 3000 ft. They are prolonged southwards into Antrim, where similar basalts overlying Secondary strata cover a large territory. Occasional beds of tuff arc intercalated among these lavas, and likewise seams of fine clay or shale which have preserved the remains of numerous land-plants. The presence of these fossils indicates that the eruptions were subaëriab and a comparison of them with those elsewhere found among Older Tertiary strata shows that they probably belong to the Oligocene stage of the Tertiary series of formations, and therefore that the basalt eruptions took place in early Tertiary time. The volcanic episode to which these plateaus owe their origin was one of the most important in the geological history of Great Britain. It appears to have resembled in its main features those remarkable outpourings of basalt which have deluged so many thousand square miles of the western area of the United States. The eruptions were connected with innumerable fissures up which the basalt rose and from numerous points on which it flowed out at the surface. These fissures with the basalt that solidified in them now form the vast assemblage of dykes which cross Scotland, the north of England and the north of Ireland. That the volcanic period was a prolonged one is shown by the great denudation of the plateaus before the last eruptions took place. In the Isle of Eigg, for example, the basalts had already been deeply eroded by river-action and into the river-course a current of glassy lava (pitch-stone) flowed. Denudation has continued active ever since, and now, owing to greater hardness and consequent power of resistance, the glassy lava stands up as the prominent and picturesque ridge of the Scuir, while the basalts which formerly rose high above it have been worn down into terraced declivities that slope away from it to the sea. A remarkable feature in the volcanic phenomena was the disruption of the basaltic plateaus by large bosses of gabbro and of various granitoid rocks. These intrusive masses now tower into conspicuous groups of hills—the Cuillins in Skye, the mountains of Rum and Mull, and the rugged heights of Ardnamurchan.

*Post-Tertiary.—*Under the Post-Tertiary division come the records of the Ice Age, when Scotland was buried under sheets of ice which ground down, striated and polished the harder rocks over the whole country, and left behind them the widespread accumulation of clay, gravel and sand known as Glacial Deposits. The Till or Boulder Clay, the most universal kind of Drift—which covers much of the Lowlands to a depth sometimes of 100 ft., and along the flanks of hills reaches a height of 2000 ft. or more—was pushed along by ice radiating from different centres, evidence of which is to be seen in the direction of the striae on the rocky surface of the country as well as in the dispersion of boulders and stones from recognizable districts. Thus remains of Highland schists have been borne across the Central Plain and deposited on the northern margin of the Southern Uplands. Above the Boulder Clay are found sands and gravels, along with perched boulders which, by their source and position, indicate the direction and thickness of the ice that carried them. Moraines of the last of the glaciers arc numerous throughout the Highlands.

*Recent.—*The youngest formations are the raised beaches—consisting sometimes of ledges cut in the rock, as on Lismore and other parts of Loch Linnhe, and sometimes of heaped-up beds of sand and gravel—river terraces, lake deposits, peat-mosses, tracts of blown sand—notably seen in the dunes of Culbin, Rattray Head, Aberdeen, Montrose and Tents Muir on the east coast, and at Stevenston, Troon, Ayr Glenluce and along North and South Uist on the west. These arc related to the present configuration of the land and contain remains of plants and animals still living on its surface. (A. Ge. ; J. A. M.)

*Climate*

In considering the climate of Scotland the first place must be assigned to the temperature of various districts during the months of the year 'since this, and not the mean temperature of the whole year, gives the chief characteristics of climate. Thus, while the annual temperatures of the west and east coasts are nearly equal, the summer and winter temperatures are very different. At Portree (on the east coast of Skye) the mean temperatures of January and July are 39° and 56∙8° F., whereas at Perth they are 37·5° and 59∙0°. The prominent feature of the isotherms of the winter months is their north and south direction, thus pointing not to the sun but to the warm waters of the Atlantic as the more powerful influence in determining the climate at this season through the agency of the prevailing westerly winds. In exceptionally cold seasons the ocean protects all places in its more immediate neighbourhood against the severe frosts which occur in inland situations. While this influence of the ocean is felt at all seasons, it is most strikingly seen in winter and is more decided in proportion as the locality is surrounded by the warm waters of the Atlantic. The influence of the North Sea is similarly apparent, but in a less degree. Along the whole of the eastern coast, from the Pentland Firth southwards, temperature is higher than what is found a little inland. In summer, everywhere, latitude for latitude, temperature is lower in the west than in the cast and inland situations, but in winter the inland climates are the colder. The course of the isothermal lines in summer is very in­structive. Thus the line of 59° passes from the Solway directly northwards to the north of Perthshire and thence curves round east­ward to near Stonehaven. From Teviotdale to the Grampians temperature falls only one degree; but for the same distance farther northwards it falls three degrees. The isothermal of 56° marks off the districts where the finer cereals can be successfully raised. This distribution of the temperature shows that the influence of the Atlantic in moderating the heat of summer is very great and is felt a long way into the interior of the country. On the other hand, the high lands of western districts by robbing the westerly winds of their moisture, and thus clearing the skies of eastern districts, exercise an equally striking effect in the opposite direction—in raising the temperature.

There is nearly twice as much wind from the south-west as from the north-east, but the proportions vary greatly in different months. The south-west prevails from July to October, and again from December to February; accordingly in these months the rainfall is heaviest. These are the summer and winter portions of the year, and an important result of the prevalence of these winds, with their accompanying rains, which are coincident with the annual extremes of temperature, is to imprint a more strictly insular character on the climate, by moderating the heat of summer and the cold of winter. The north-east winds acquire their greatest frequency from March to June and in November, which are accordingly the driest portions of the year.

The mountainous regions are mostly massed in the west and lie generally north and south, or approximately facing the rain-bringing winds from the Atlantic. Thus the climates of the west arc essenti­ally wet. On the other hand, the climates of the east arc dry, because the surface is lower and more level; and thö breezes borne thither from the west, being robbed of most of their superabundant moisture in crossing the western hills, are drier and precipitate a greatly diminished rainfall. It thus happens that the driest climates in the cast are those which have to south-westwards the broadest extent of mountainous ground, and that the wettest eastern climates are those which arc least protected by high lands on the west. The breakdown of the watershed between the Firths of Clyde and Forth exposes southern Perthshire, the counties of Clackmannan and Kinross, and nearly the whole of Fife to the clouds and rains of the west, and their climates are consequently wetter than those of any others of the eastern slopes of the country. The driest climates of the east are in Tweeddale about Kelso and Jedburgh, the low grounds of East Lothian, and those on the Moray Firth from Elgin round to Dornoch. In these districts the annual rainfall averages 26 in., whereas over extensive breadths in the west it exceeds 100 in., in Gleneroe being nearly 130 in., and on the top of Ben Nevis it may reach 150 in.

II. Economic Conditions, &c.

*Population.—*At the end of the 15th century it is conjectured that the population of Scotland did not exceed 500,000— Edinburgh having about 20,000 inhabitants, Perth about 9000, and Aberdeen, Dundee and St Andrews about 4000 each. By the Union with England (1707) the population is supposed to