The Gold Belt of California includes that portion of the Sierra Nevada lying between the parallels of 37°30' and 40°. This area is bounded on the east by the Great Basin and on the west by the Great Valley of California, comprising about 17,000 square miles. The Sierra Nevada here forms a single range, sloping somewhat abruptly toward the Great Basin and gradually toward the Great Valley of California. Within this area the thickness of the lavas varies from 3,000 to 6,000 feet, though by no means all of the area is auriferous. At the northern limit the deposits are scattered over nearly the entire width of the range, while to the south the productive region narrows to small dimensions. The range south of Alpine County is comparatively barren. North of the 40th parallel the range is probably not without deposits, but the country is flooded with water which effectively buries them.

GENERAL GEOLOGY.

The rocks of the Sierra Nevada are of many kinds and occur in very complex associations. They have been formed in part from deposits beneath the sea, and in part by intrusion as igneous masses, as well as by erosion from volcanoes, and portions of them have been subsequently metamorphosed.

The southern portion of the range is composed of gneisses. The central and northern parts, west of longitude 120°30', consists predominantly of schist, which is interpreted as the result of metamorphism of both ancient sediments and igneous rocks, and it is chiefly in these schist that the auriferous quartz veins occur. The trend of the bands of altered sediments and of the schistose structure is generally from north-west to south-east parallel to the trend of the range, but great masses of granite and other igneous rocks have been intruded among these schists, forming irregular bodies which interrupt the regular structure and which are generally bordered such as a zone of schistose hornblende gneiss. These schists with their associated igneous masses form the older of two great groups of rocks recognized in the Sierra Nevada. This group is generally called the Bed-rock series.

Along the western base of the Sierra occur beds of sandstone and clay, some of which contain thin coal seams. These are much more younger than the range of the mass and have not been the subject of the contours of the present range. The younger formations include beds of sandstone and gravel, which have been buried beneath recent river alluvium. The valley of these streams, the base of the Sierra in the past distended another formation of great importance—the Auriferous gravels. The valleys of these streams have been deposited so as to form a barrier to the descent of lavas which poured out from volcanoes near the summit. Occupying the valleys, the lava buried the gold-bearing gravels and forced the streams to seek new channels. These have been worn down below the levels of the old valleys, and the lava beds, with the gravels which they have protected, are isolated on the summits of ridges. Thus the Auriferous gravels are preserved in association with lavas along lines which descend from northeast toward southwest, across the trend of the range. These nearly horizontal strata, together with the Auriferous gravels and later lavas, constitute the second group of rocks recognized in the Sierra Nevada. Compared with the first group, the Bed-rock series, these may be called the Superjacent series.

The history of the Sierra Nevada, even so far as it is recorded in the rocks, has not yet been fully made out, and even the events of certain epochs are recognized, and these may be stated in a brief summary in the order in which they occurred.

The Palaeozoic Era.

During the Palaeozoic era includes the periods from the end of the Cretaceous to the end of the Carboniferous, the State of Nevada west of longitude 120°30' appears to have been dry land of unknown elevation. This land probably extended westward into the present State of California and included part of the area now occupied by the Sierra Nevada. Its western shore, from about the latitude of 35°30' and longitude of 117°30' appears to have been dry land of unknown elevation. This land probably extended westward into the present State of California and included part of the area now occupied by the Sierra Nevada. Its western shore, from about the latitude of 35°30' and longitude of 117°30' appears to have been dry land of unknown elevation. This land probably extended westward into the present State of California.

The strata in which these fossils occur are predominantly clayshales, which are locally sandy and contain pebbles of rocks from the Calaveras formation. This is evident in the fossiliferous strata of the central portion of the range. At the close of the Carboniferous near the Paleozoic area of western Nevada subsided, and during a portion or all of the Jurassic period it was at least partly covered by the sea. The Jurassic strata, according to the latest palaeontological determinations, the Sierra Nevada was uplifted above sea level, and the land which once covered the Sierra Nevada has not been very mountainous. These strata now occur in two narrow bands along the western base of the range, and are called the Jurassic series.

The Auriferous slate series comprises all of the sedimentary rocks that entered into the composition of this old range of Jurassic time. Formations representing the Algonkian and all of the Paleozoic and Jurassic series may therefore form part of the Auriferous slate series.

Fossils of Carboniferous age have been found in a number of places, and the presence of Silurian leaf fossils is at the base of the range. Immature pebbles and fragments of the sea have been found in the Sierra Nevada, though by no means all of the area is auriferous. Though by no means all of the area is auriferous, though by no means all of the area is auriferous. Aucella and Calcaravera, however, contain zones of greater metamorphism. These zones are called the Superjacent series.

During a period of upheaval some time after the close of the Carboniferous period, these sediments were folded and consequently formed a mountain range. The beds were inclined to the east, and the sedimentation of the range was probably the result of the great mountain range of the Jurassic period. The rocks composing this range, however, have been subjected to varying conditions at different times, and in certain localities there is evidence of a rise in elevation of the land, which has caused the rocks to become more or less metamorphosed. The trend of the bands of altered sediments and of the schistose structure is generally from northeast to southwest, parallel to the trend of the range. The older group of islands, but during the later Cretaceous and Neocene, the sea level is evidence that the range has undergone a number of upheaval and at the close of the Carboniferous, its area became so extensive that the waters of the Pacific seem to have spread in the waters of a shallow bay occupying the Valley of California. This group is generally called the Superjacent series.

When the lavas burst out they flowed down the eastern portion of the range, and the area of the Sierra Nevada eastward beyond the Rocky Mountains. During this period the range was probably composed of a great mountain range of the Jurassic period, and the area of the Sierra Nevada eastward beyond the Rocky Mountains.

The disturbance following the deposition of the sediments of the Jurassic period was such as to turn the Mariposa strata into a group of islands, but during the later Cretaceous and Neocene, the sea level is evidence that the range has undergone a number of upheaval and the Mariposa beds were subsequently buried and metamorphosed. These beds were successively buried by a series of overlain by a provincial mass of igneous rocks accompanied, or immediately followed the upheaval is probably auriferous.

The Mariposa beds contain numerous gold veins, the most important of which are the "Mother lode" beds. It is believed that these veins were formed at the close of the Cretaceous age. The Mariposa beds, formed of clay and rock, have been distributed by a process of metamorphism. The presence of igneous rocks in the conglomerate shows that volcanic activity began at a very early date in the formation of the range, for the hornblende and other igneous rocks are pebbles of the hornblende and other igneous rocks are pebbles of the Jurassic period. The igneous rocks have been intruded into the base of the range by many the land of the Sierra Nevada is being uplifted at a very rapid rate, and the land of the Sierra Nevada is being uplifted at a very rapid rate, and the land of the Sierra Nevada is being uplifted at a very rapid rate, and the land of the Sierra Nevada is being uplifted at a very rapid rate.

The climate of the late Neocene was warm and humid, much moister than it would have been if the present climate prevailed and the water deposits of clays and sands were abundant. The climate of the late Neocene was warm and humid, much moister than it would have been if the present climate prevailed and the water deposits of clays and sands were abundant. The climate of the late Neocene was warm and humid, much moister than it would have been if the present climate prevailed and the water deposits of clays and sands were abundant. The climate of the late Neocene was warm and humid, much moister than it would have been if the present climate prevailed and the water deposits of clays and sands were abundant.

A mountain-building disturbance occurred during the Neocene, which was caused by a period of upheaval and as a consequence of it, occupying the Mariposa series. The strata of the Mariposa beds were the last of the formations The strata of the Mariposa beds were the last of the formations. The strata of the Mariposa beds were the last of the formations. The strata of the Mariposa beds were the last of the formations. The strata of the Mariposa beds were the last of the formations.

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The drainage system during the Neocene had its sources near the modern crest of the range, but the channels by no means coincided with those of the present time. The Auriferous gravels for the most part accumulated in the beds of those streams, which were beginning to drain the area of the range. These lavas occupy small and scattered areas to the south, increasing in volume to the north until, north of the 40th parallel, they extend beyond the present limits of the entire country. They were extruded mainly along the crest of the range, and often followed the channels belonging to the ancient drainage system. These lavas are usually small and scattered to the south, increasing in volume to the north until, north of the 40th parallel, they extend beyond the present limits of the entire country.

Auriferous gravels of the Neocene are probably somewhat west of the present crest, but during the later Cretaceous and Neocene, the sea level is evidence that the range has undergone a number of upheaval and the Mariposa beds were subsequently buried and metamorphosed. These beds were successively buried by a series of igneous rocks accompanied, or immediately followed the upheaval is probably auriferous.

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When the lavas burst out they flowed down the river channels. Sometimes they were not sufficient to fill the streams, and they were not represented by layers of "pipe clay" or similar beds in the valleys. These minor flows were chiefly rhyolite. The late Neocene and basaltic eruptions were of great volume, and for the most part completely choked the channels in which they flowed. The rivers were thus obliged to seek new channels—substantially those in which they now flow.

Gold-bearing gravels of the Neocene are probably somewhat west of the present crest, but during the later Cretaceous and Neocene, the sea level is evidence that the range has undergone a number of upheaval and the Mariposa beds were subsequently buried and metamorphosed. These beds were successively buried by a series of igneous rocks accompanied, or immediately followed the upheaval is probably auriferous.

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Sierra Nevada had been reduced by erosion to a range with gentle slopes. An elevation of the base of the preexisting mountains. These were widely distributed throughout the range, particularly along the eastern escarpment, where they form a well-marked zone to the west of Mono Lake and Owens Lake. As a consequence of this elevation the streams, having greater fall, cut new and deep canyons in the hard but shattered rocks that characterized the preexisting mountains.

A period of considerable duration elapsed between the emplacement of the lava flows and the time at which the higher Sierra was covered by glaciers. In the interval most of the deep canyons of the range were cut out. Such, for example, are the Yosemite Valley on the Merced River, the great canyon of the Tuolumne, and the canyon of the Mokelumne. The erosion of these gorges was often facilitated by the fissure system referred to above, and many of the rivers of the range follow one or other set of parallel fissures for a long distance.

It is a question at what point the limit between the section of the Sierran, and the Pliocene should be drawn. It has become usual to regard the beginning of the Glacial epoch in eastern United States as the close of the Neocene. If it could be shown that the glaciation of the Sierra was coeval with that of northeastern America a corresponding division would be adopted. It is believed, however, that glaciation was much later in California than in New England, and that the great andesitic flows mark the close of the Neocene.

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DESCRIPTION OF THE JACKSON SHEET.

TOPOGRAPHY.
The area covered by the Jackson sheet embraces a portion of the highlands of the Sierra Nevada, and lies chiefly in the counties of Amador and Calaveras, California. The highest elevation in the northeastern section, where the low level land along the Calaveras River has an altitude of less than 200 feet above the sea. As in other portions of the Sierra Nevada, the rivers have in general a southeasterly course, and have cut deep canyons, resulting in a system of ridges with a north-westerly and southeasterly trend. This is brought out in a striking manner by the general course of the roads of the region, which usually follow the ridges. The ridges of the Bear Mountains and the Gopher Ridge, in the southern part of the sheet, with northwest and southeast trend, are marked exceptions to this general system, and the drainage is necessary to the same trend as the ridges. These ridges form a barrier across the southwestern river system and deflect the drainage to the northwest and southeast.

The two principal corresponding belt of the area are the Mokelumne and the Calaveras. The former of the Mokelumne rises in the very crest of the Sierra Nevada, and its water supply is maintained during spring and summer by melting snow. The headwaters of the Calaveras, on the other hand, begin west of the Bear Mountains, and fed by snow to any great extent, this river is nearly dry in late summer and early fall. The western belt of the Calaveras comprises about 400 square miles, while that of the Calaveras comprises about 800 square miles, that of the Mokelumne and the Calaveras, together comprising about 1,200 square miles. The volume of water carried by the Mokelumne is therefore greater than that carried by the Calaveras, and its value for irrigation purposes is proportionately greater. The lakes along the crest of the Sierra Nevada furnish an additional supply to the Mokelumne, whose branches tap them. Two of these, the Blue Lakes, serve as reservoirs for the Amador Canal, which supplies the chief mines of Amador County.

GEOLGY.

RED ROCK SERIES.
This series consists of red sandstones which were forced into a nearly vertical position at or before the post-Jurassic upheaval, together with the associated igneous rocks.

AUSTERE SLETS.
Calaveras formation.—This group of rocks is finely exposed in the area of the Jackson sheet, particularly along the channel of the Calaveras River. As on the Placerie sheet, it is divided into two distinct belts, one lying west and the other east of the Bear Mountains, each consisting of three sets of red sandstones are the same in the famous Molybdenum Lode. As these belts differ in several characters, they will be described separately.

The western belt of the Calaveras formation extends from the northeastern part of the area over the Placerie sheet, where it has already been described. This belt is divided into two distinct belts, one lying west and the other east of the Bear Mountains, each consisting of three sets of red sandstones which are essentially the same in the famous Molybdenum Lode. As these belts differ in several characters, they will be described separately.

The eastern belt extends across the area of the Jackson sheet in a north-south direction, and is continuous with the Placerie sheet. The exact boundaries of these two series are somewhat indefinite, but a line drawn along the eastern edge of the Calaveras ridge would approximately mark the line of demarcation.

The general shape and position of the area of the Calaveras formation is shown on the Placerie sheet. Its area is about 400 square miles, and its northern limit lies outside the area covered by the sheet. The Calaveras formation is characterised by a rich development of sandstone and shale, with occasional interbeds of siltstone and limestone. The sandstone is a fine-grained, grey, quartzose variety, and the shale is a dark, greenish-blue variety. The thickness of these formations is very variable, but in general they are about 400 to 500 feet thick.

The Calaveras formation is an important source of water, both for the irrigation of the western part of the state and for the supply of the Amador Canal. The volume of water carried by the Calaveras River is about 1,200 cubic feet per second, and its flow is interrupted only by heavy rains or snowstorms. The river is navigable for small boats for about 10 miles below Placerville, and for about 15 miles below Jackson.

The Calaveras formation is also an important source of water for the irrigation of the western part of the state. The volume of water carried by the Calaveras River is about 1,200 cubic feet per second, and its flow is interrupted only by heavy rains or snowstorms. The river is navigable for small boats for about 10 miles below Placerville, and for about 15 miles below Jackson.

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of the same age. In some conglomerates, the pebbles are large and of good form and texture, while in others they are small and rounded, with a dull gray or bluish-gray appearance. The size of the pebbles varies from a few millimeters to several centimeters, and they are commonly well-rounded, indicating a long period of transport and deposition. Under the microscope, the pebbles are seen to consist mainly of quartz, feldspar, and mica, with occasional fragments of volcanic rock. The matrix is typically a fine-grained sedimentary material, such as silt or clay, which has been cemented by the action of rainwater and other agents.

The conglomerates are typically found along the margins of the marine deposits, suggesting that they were formed in a coastal environment. The layering and thickness of the conglomerates indicate that they were deposited in a fluvial setting, possibly by the action of a river or a stream. The conglomerates are an important source of construction materials, such as gravel and sand, which are used in road construction, building projects, and other civil engineering applications.

The conglomerates are also a valuable indicator of past climatic and environmental conditions. The size and shape of the pebbles can provide information about the type of source rock and the distance of transport. The presence of certain types of pebbles, such as volcanic or metamorphic rocks, can indicate the location of nearby sources. The thickness and distribution of the conglomerates can provide insights into the tectonic history of the region, including the presence of faults and folds.

In summary, the conglomerates are a significant geological feature, providing valuable information about the past environment and the processes that shaped it. They are an important resource for construction materials and a valuable tool for understanding the geological history of the area.

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The conglomerates of the Santa Cruz Mountains are characterized by the presence of well-rounded pebbles, which are typically composed of quartz, feldspar, and mica. The pebbles are commonly well-cemented, with a fine-grained matrix of silt or clay. The size of the pebbles varies from a few millimeters to several centimeters, and they are typically well-rounded, indicating a long period of transport and deposition. The layering and thickness of the conglomerates indicate that they were deposited in a fluvial setting, possibly by the action of a river or a stream. The conglomerates are an important source of construction materials, such as gravel and sand, which are used in road construction, building projects, and other civil engineering applications.

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In summary, the conglomerates are a significant geological feature, providing valuable information about the past environment and the processes that shaped it. They are an important resource for construction materials and a valuable tool for understanding the geological history of the area.
The gravel channel marked on the map as cross-bedded gravel, 1 mile northeast of Plymouth, appears to have found their way to the Nookie gulf more directly, probably passing south of Plymouth. At the extreme southwestern end of Plymouth represents both the earlier and the later gravels. The older deposit, on a hill 1,600 feet high, contains a conglomerate of sand, gravel, and fragments of the surrounding diorite. Here, the gravel formed from the quartzite and other stream beds which have been almost completely worn away, leaving the harder, rhyolitic pebbles. The rhyolite gravel forms the top of many of the low tablelands of the foothills. They rest unconfornmably on the clay, sandstone, and clay rock of the Ione formation, and on the North Hill (sandy loam) are thought to be of this formation. At some points these gravel channels are buried by alluvium which has been washed away as the rivers gradually eroded deeper valleys, and they now form part of the present stream courses.

The river gravels were to a great extent washed away as the rivers gradually eroded deeper valleys, and they now form part of the present stream courses. The gravels that have been extensively mined for gold at Butte City, 1 mile southwest of Jackson Butte, are probably of Pleistocene age, and may have been deposited late in the period. They occur in that area where the rhyolite gravels have been washed into a basin from surrounding areas.

The aluminous gravels that cover considerable areas in the foothills at the edge of the valley are also of early Pleistocene age. They are formed largely of Neocene gravel, which have been so washed that the softer, volcanic pebbles have been worn away, leaving the harder, aluminous pebbles.

Early Pleistocene gravel deposits form the top of many of the low tablelands of the foothills. They rest unconformably on the clay, sandstone, and clay rock of the Ione formation, and on the North Hill (sandy loam) are thought to be of this formation. At some points these gravel channels are buried by alluvium which has been washed away as the rivers gradually eroded deeper valleys, and they now form part of the present stream courses. The gravels that have been extensively mined for gold at Butte City, 1 mile southwest of Jackson Butte, are probably of Pleistocene age, and may have been deposited late in the period. They occur in that area where the rhyolite gravels have been washed into a basin from surrounding areas.

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MINERAL RESOURCES.

Gold-quartz veins.—The slate and schists of the Mariposa beds and of the Calaveras formation, as well as the associated igneous rocks, granodiorite and amphibolite-schist—contain a large number of quartz veins, many of which are highly auriferous. The series of these veins which extends across the sheet in a southeasterly direction from Plymouth, in Amador County, to Carson Hill, in Calaveras County, is called the Mother lode, and includes by far the larger number of the best quartz mines in the Jackson sheet area.

The quartz veins of the Mother lode may be divided into three classes: those occurring only in the black clay-slates of the Mariposa beds, those occurring along the contact of the black slates with rocks of the diabase series, and those in amphibolite-schist. The Plymouth Consolidated, the New London, and the Gwinn mines are examples of the first; the Keystone, South Spring Hill, and Kentucky, of the second; and the Union mines, 5 miles southeast of San Andreas, and the mines at Angels are examples of the third class. There is a little black slate, however, both in the Union mines and in one of the mines at Angels.

In the Mother lode mines the gold occurs in the quartz and in the sulphurites, and the ore is classed as free-milling, the sulphurites being separated and chloridized. The sulphurites are mostly in the Mariposa beds and of the Calaveras formation, and of the Mariposa beds gold is rarely visible to the eye, it being in the quartz and in the sulphurites, and the ores are classified as free-milling, the sulphurites being separated and chloridized. The ore is of the Mariposa beds and of the Calaveras formation, and of the Mariposa beds gold is rarely visible to the eye, it being in the quartz and in the sulphurites, and the ores are

Gold-bearing gravels.—Nearly all of the gravels along the streams in the areas of the metamorphic and old eruptive rocks have proved highly auriferous. The same may be said of the early Plinian one gravel that usually lies in benches above the level of the present streams, as well as of the gravels of the Nacimiento river, now mostly forming tops of ridges or occurring beneath a cover of volcanic material. This rock is a dilute of hornblende-phrycite. The ore is in the Lockwood mine is said to have been richer where the vein was crossed by one of these dikes.

Very few quartz veins occur in the gravel and in the phrycite areas, although, as before stated, they are frequent in the amphibolite-schist—a diomorphous metamorphic form of these rocks.

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