found to the eastward any place, from which they could have been transported to their present position. The age of this breccia was determined to be Miocene and probably the equivalent of a portion of the "Monterey."

The size of this westward land mass, now submerged, except for portions of the "Channel Islands," must have been considerable, although the exact boundaries may never be known. Many of the fragments of which the breccia is composed are large and angular, but the indications are that there were streams flowing eastward.

This work, supported by exact petrographic studies, adds still another link to the chain of evidence which has been accumulating and which demonstrates almost beyond contention the existence to the westward of North America of a land mass of probably continental size. The eastern boundary of this land probably disappeared or at least was greatly lowered in elevation at the close of the Miocene epoch. During that long period of geologic time there accumulated in what is now California enormous thicknesses of sediments composed very largely of the skeletons of microscopical organisms. Some measured sections of this deposit are over 8,000 feet thick. The preponderance of these organisms over clays, sands or other materials derived from erosion of land areas demonstrates that the climate of the region throughout the period of deposition was one of great aridity. A logical explanation for this aridity exists in the supposition of a mountain range to the westward of the present shore line which cut off the moisture, just as to-day the coast ranges cause desert conditions to appear in the interior valleys of California.

The close of the Miocene was marked by an abrupt change in the features of sedimentation: micro-organisms became relatively scarce and clastic materials derived from land masses made up the greater part of the deposits. It would therefore seem that the cause of the great aridity during the Miocene was suddenly removed and a period of much precipitation followed. A lowering of this offshore Pacific mountain barrier would probably produce just such a result.

Of course great aridity at a given place is not necessarily dependent upon an outlying offshore barrier, as the climate of the coastal region of Chile and Peru abundantly proves, but in the California region that appears to be the most reasonable explanation.

Other evidence pointing toward the existence of a land area to the westward of the present shore line is found in the existence here and there of isolated "islands" composed of granite rocks. The Farallon Islands, the tip of Point Reyes Peninsula and Point Pinos near Monterey are some of these areas, far removed from any similar rocks. Granite is generally considered to belong exclusively to the continental land masses. Farther to the south, off the west coast of Mexico, there is a larger mass of the same rock, forming the Cape Region of Lower California. Also one of the discoveries made by the California Academy of Sciences Expedition in 1925 was a granitic core in Maria Madre Island. Likewise, sixty miles west of Socorro Island, one of the Revillagigedo group, there is an isolated menace to navigation, called Roca Partida. The walls of this are perpendicular and landing was impossible, but from a row boat the rock had every appearance of being composed of granite.

Can all these points be the last remnants of a continent which existed when much of Central America and California were submerged? It certainly looks as if this question might be answered in the affirmative with very little qualification.

G. DALLAS HANNA
CALIFORNIA ACADEMY OF SCIENCES

ULTRA-VIOLET LIGHT AND ANTI-RACHITIC VITAMIN IN THE HENS' EGGS

IN concluding their article on "The influence of ultra-violet light on leg weakness in growing chicks and on egg production,"[1] Hughes, Payne and Latshaw state: "The variation in the hatchability of the eggs produced by hens receiving varying amounts of ultra-violet light is perhaps due to a variation in the anti-rachitic vitamin content of the egg. This is merely an assumption but points the way to some very interesting research work." This year experiments have been completed in which the relative anti-rachitic vitamin content of eggs from hens receiving different amounts of ultra-violet light has been determined and, as predicted last year, the hens which receive an abundance of ultra-violet light are able to put an abundance of the anti-rachitic vitamin in their eggs, while the hens which receive a very limited amount of ultra-violet light are able to put only a small amount of the anti-rachitic vitamin in their eggs.

In this experiment eggs from four pens of hens receiving varying amounts of ultra-violet light were tested by feeding the eggs to growing chicks. These four pens of hens were housed in a shed-roof type house with a south exposure. Each pen was eight feet by ten feet and had a glass window in the south side three feet by eight feet. Pens 1 and 3 were allowed a run to the south of the house, where they had access to direct sunlight. The windows in Pens 2 and 4 were kept closed at all times, so all the sun-

[1] *Poultry Science*, Vol. IV, No. 4, April-May, 1925.

light received by these pens was filtered through glass. Pens 1 and 2 received a thirty-minute treatment of ultra-violet light each day from a quartz mercury arc lamp. In this way Pen 1 received both the direct sunshine and ultra-violet light from the mercury arc lamp. Pen 2 received sunlight filtered through glass and light from the mercury arc lamp. Pen 3 received direct sunshine, while Pen 4 received only the glass-filtered sunshine. The hens were placed on the experiment October 1, 1924, and the experiment to determine the relative vitamin content of the eggs was begun six months later, April 1, 1925.

Four lots of growing chicks were used to test the relative anti-rachitic vitamin content of the eggs from these four pens of hens. These pens of chicks were kept in the nutrition laboratory on a basal ration and under conditions which would cause them to develop rickets in about four to six weeks. In addition to this basal ration each pen of twelve chicks received one egg a day from one of the pens of hens. Pen 1 of chicks received an egg each day from Pen 1 of hens, etc. This feeding experiment was continued for eight weeks at which time the chicks in each lot were killed for chemical analyses. The chicks in Pens 1 and 3, which received eggs from hens receiving direct sunshine, developed normally as shown by their general appearance as well as by chemical analyses of their blood and bones.

The chicks in Pen 2, which received the eggs from the hens that received sunlight filtered through glass and a thirty-minute exposure to the mercury arc lamp, developed some rickets; but they were in much better shape than the chicks in Pen 4, which received eggs from the hens that received no ultra-violet light except that which came through the glass window.

This test with the growing chicks has been repeated a second time with results in agreement with the first trial. From these results we conclude that the anti-rachitic vitamin content of eggs will vary with the amount of ultra-violet light the hens receive when their feed is low in this substance.

In this experiment the eggs from Pen 1 hatched 67 per cent.; Pen 2, 72 per cent.; Pen 3, 75 per cent.; and Pen 4, 53 per cent. These results, as well as the results we obtained last year, indicate that the anti-rachitic vitamin content of eggs is one factor in the development of a strong vigorous chick. Cod-liver oil at the rate of ½ cc per hen per day produced eggs which hatched as well as those from hens receiving direct sunshine.

J. S. HUGHES
R. W. TITUS
J. M. MOORE
KANSAS STATE AGRICULTURAL COLLEGE

ANENT THE "HARMLESS" CORAL SNAKE

THE coral snake is poisonous, but not vicious. Two of the largest dealers in live snakes of the south and southwest know them to be poisonous from personal experience and are so cautious that they handle mimic scarlet king snakes with the same care. In spite of the fact that we have captured, studied and photographed alive about every species of snake from Georgia to Arizona, we nevertheless almost unconsciously use the same extreme caution with several species of non-poisonous scarlet king snakes.

It is true that one very rarely encounters authentic cases of fatal coral snake bite. It would, however, be unwise to call the species harmless. For example, in Georgia, one of our party who was barefooted stepped on a cottonmouth in the water. The same day he reached into a wood rat's nest and, when he withdrew his hand, a cottonmouth presently came out of the nest. In neither case was he bitten. Nevertheless, he respects this snake as poisonous and will never again stick his hand in such a nest. In July and August, 1925, we saw two men who handle and have handled more gila monsters than any one else in the U. S. A. Both were bitten this summer by gila monsters with no bad effects, yet these gentlemen respect these poisonous reptiles. They feel it was their good fortune to escape. Like many of us, they do not consider these creatures vicious and make pets of them.

The coral snake is a burrower, is secretive and is most active at night or after rains. The collector or the average individual seldom encounters it. It is not vicious. One example will suffice. On the 75-mile practice-march of the five thousand U. S. soldiers from Ft. Sam Houston this summer, one soldier picked up a pretty snake. He and his fellows treated it as a pet for two or three days. In the end he asked the Y. M. C. A. director to care for it. This gentleman did and asked me for its identification one week later. Many Y. M. C. A. men for a week played with it. None of these were bitten. This coral snake was good-natured, yet potentially very poisonous.

The coral snake, as Professor Dunn contends, can open its mouth wide enough to bite a human being. We had one captive coral snake, which frequently opened its mouth a few days previous to its approaching death. Also one evening about 8:30 P. M. (darkness) my wife discovered a coral snake at the ranch gate. The instant we laid a stick on it, it resisted capture with great vigor, and constantly opened its