terrupted by the war, in which he served as surgeon in the army, and his report was submitted in 1867, but not printed until 1869. With this was a geological coloring of Raynold's topographical map, which gives in a very generalized form the current ideas with regard to the geology of the country east of the mountains. It shows the anticlinal structure observed in the Black Hills extended to all the ranges facing the plains. In the interior, granites, igneous and metamorphic rocks are all grouped under one color, and no formation between Carboniferous and Potsdam is recognized. The age of the coal-bearing beds is given as Tertiary.

1867. I will mention here the contributions of John LeConte in 1867, though not strictly in chronological order, nor under government auspices, yet they were part of the general scheme of exploration of the country for the projected Pacific railroad. He was attached to the party of Gen. W. W. Wright, of the eastern division of the Union Pacific Railroad, which was exploring various routes from Fort Lyon, Kansas, to Fort Craig, New Mexico. He made a more careful study of the coal-bearing rocks than had yet been made, and maintained his belief in spite of the evidence of fossil plants as interpreted by Lesquereux, that they were Cretaceous rather than Tertiary, a belief founded mainly on Molluscan fossils of Cretaceous age found by him in association with the coal beds, but in part also on a reasoning that the development of plant life in this country had not been strictly contemporaneous with that of Europe. On this point he says: "The difference between the plants of our early Cretaceous and those of the Middle Tertiary could be ascertained only by the aid of the stratigraphy of the region, and we have no right from a few resemblances in vegetables to infer the synchronism either of the Western lignite beds with each other, or any of them with the European Eocene and Miocene, except when supported by lithological evidence from animal remains.

"It would therefore appear plausible, in the absence of more direct evidence, to believe that since the introduction of dicotyledons in large numbers in our early Cretaceous there has not been any great change in the types of structure; and that such changes, while following in general plan those introduced on the eastern continent during this period, have not been synchronous with them."

He noted several unconformities in the beds, and presented a history of the orographic growth of the Great Plains in Mesozoic time, which shows a remarkably philosophical interpretation of the facts then known. His idea was that the region grew, by a series of gradual elevations connecting Paleozoic islands, into one landmass; that a great peninsula was developed running eastward from the Rocky Mountains and contracting the intercontinental Cretaceous ocean. Thus by the end of the Middle Cretaceous this ocean was divided into two gulfs, a northern and a southern, in which toward the end of that period the faunas became quite different. Finally, independent shallow basins were formed in which conditions for coal accumulation prevailed.

S. F. EMMONS.
U. S. GEOLOGICAL SURVEY.

(To be concluded.)

PHASES IN JAMAICAN NATURAL HISTORY.

PROF. J. E. DUERDEN,* Curator of the Museum of the Institute of Jamaica, has recently published an article which gives new and interesting data concerning the results of the introduction of the Mongoose to the Island.

* Contributions to the Natural History of Jamaica. By J. E. Duerden, Curator of the Museum of the Institute of Jamaica. Kingston, November, 1896.

The story of how the Mongoose was brought into Jamaica from India in 1872 for the purpose of destroying the imported European black and brown rats which were devouring the crops of the sugar-cane and other vegetal products, and how it increased until it became a veritable pest, is well known to history. The Mongoose thrived and exterminated the rats, and having enjoyed this diet, he began a series of food experiments upon all small domestic animals, especially poultry. In some instances, he even killed small pigs, kids, lambs, newly dropped calves, puppies, kittens. All kinds of game, such as partridges, quail, guinea-fowl, snipe, lapwing, ground doves, young buzzards, and all birds which nest on or near the ground, and their eggs were much to his taste, and he has been known to catch fish. He likewise, developed a special fondness for snakes, ground lizards, frogs, turtle and turtle's eggs, land crabs and other of the more humble creatures. Not only did his appetite crave the above animal diet, but it was rapacious in its assaults upon ripe bananas, pineapples, young corn, avocado pears, sweet potatoes, cocoas, yams, peas, and certain fruits. He even competed with his former enemy, the rat, in eating the sugar-cane, and did not hesitate in attacking salt meat.

As a consequence of the fecundity and omnivorous appetite of the Mongoose, Jamaica was soon rid not only of its rats, but of all the game and birds, except such, like the ground dove, as had the discretion to transfer their breeding places upon his advent, from the ground to the tops of the high prickly cacti. As a result of the Mongoose's tastes for reptiles, the twenty-two species of lizards and five species of harmless snakes, which had hitherto proved an inestimable blessing to the island in keeping down small insect pests such as the tick, fell victims to its depredations. Notwithstanding the humble sphere which the tick and chigor occupy in the scale of life, they were not so stupid as to fail to take advantage of this destruction of their hereditary enemies, and proceeded to thrive as they had never thriven before. These minute forms of life, which had previously confined their attention to cattle, increased so rapidly that they became a pest to mankind. One could not brush against the bushes or put his foot down in the grass without being covered by the small 'seed-ticks,' as the young are called.

As a final result of this series of wars between the various kinds of lower animals, the tick and Mongoose remained as the victorious survivors. So different were their spheres in life that it was generally concluded that their rule would continue undisputed for years.

Within the past few years, according to Prof. Duerden, another phase of the question appears to have been entered upon. He says: "It is reported from practically all parts of the island that the Mongoose is not nearly so plentiful as formerly. Some of those caught are found to be suffering from the attacks of ticks. The results of the diminution are shown in the appearance and marked increase of certain species of reptiles and birds; some already alluded to as supposed to have been exterminated. Amongst the snakes there is a very noticeable increase. During the past year several examples of the yellow snake have been received at the Museum, as well as notices of others. Specimens of the spotted-chinned snake are obtained almost weekly, especially from the vicinity of Kingston; and, occasionally, an example of the two-headed snake. During the last fifteen months, however, I have never heard of the occurrence in the island of an undoubted black snake nor of the pardaline snake. Perhaps the most obvious change, remarked by everyone, is the abundance of the ground

lizard, previously recorded as extinct. Hundreds are now to be met with on the outskirts of Kingston, where only a few years ago not one was to be seen. The woodslave is not rarely seen. Crocodiles are certainly more in evidence, especially on the south side; numerous eggs, young and adult forms being now brought to the Museum. There is not nearly the same outcry against the loss of poultry and domestic animals, particularly around the towns. Correspondents from the country state that bevies of quail are to be occasionally seen, and that the various pigeons and blackbirds are more numerous.

The attorney in charge of the largest sugar estate in the island gives information that lately more of his canes are being destroyed, due to an increase in the number of rats, and that ticks are not nearly so prevalent. There seems not the slightest doubt therefore but that the maximum influence, both for good and for evil, of the Mongoose, is passing away in Jamaica; first from the vicinity of towns, but not less surely from the country districts. Of the cause we can do little more than speculate at present.

The animals now returning in greater abundance were evidently never exterminated, but only extremely rare; so that, as their destroyer in the past is becoming less important, they are increasing towards their original proportions. New balances of life are being struck in the island, and further developments will be watched with interest."

ROBT. T. HILL.
U. S. GEOLOGICAL SURVEY.

THE INTERNATIONAL METEOROLOGICAL AND HYDROLOGICAL MEETINGS.

THESE were held last autumn in France, the first and more important being the International Meteorological Conference, which met at Paris, in the Hotel de la Societé d'Encouragement, September 17th to 23d, inclusive. It had the same official character as the similar conference at Munich in 1891, to which representatives of the principal meteorological services and observatories of the world were invited. There were at Paris about forty such representatives, besides several specialists who were invited to participate in the discussions. At Munich the United States Weather Bureau had two representatives, but at Paris, unfortunately, there was not one. Mr. J. Page represented unofficially the United States Hydrographic Office, and the writer represented the Harvard College and Blue Hill Observatories. No one came from either Spain or Brazil, as was the case at Munich, but Belgium, Canada and Mexico each sent a delegate to Paris, the two latter countries participating for the first time in an international meeting.

The meeting was called to order by Mr. R. H. Scott, secretary of the Permanent International Committee, and M. Mascart, director of the French Meteorological Office, was chosen president of the meeting. The programme of questions proposed for discussion was shortened by excluding questions which had been considered at previous Congresses or which were beyond the scope of this Conference. Action on some propositions was deferred and there was an unwillingness to aid anyone to influence his government. The postponed proposition for double thermometric stations was decided by recommending that a standard thermometer shelter be adopted in each country and that comparisons be instituted between it and other shelters, and especially the Assmann aspiration thermometer. Most of the questions were considered by sub-committees on meteorological telegraphy, instruments and methods of observations, cloud observations, terrestrial magnetism and atmospheric electricity, whose reports were substantially adopted by the Conference. Among the most important opinions expressed was a general recommendation by the first-named com-