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Personal Narrative

OF TRAVELS

TO THE

EQUINOCTIAL REGIONS

OF THE

NEW CONTINENT.
CHAPTER XXIV.

The Upper Oroonoko, from Esmeralda to the confluence of the Guaviare.—Second passage across the Cataracts of Atures and Maypures.—Lower Oroonoko between the mouth of the Rio Apure and Angostura, the capital of Spanish Guyana.

It remains for me to speak of the most solitary and remote Christian settlement on the Upper Oroonoko. Opposite the point where the bifurcation takes place, the granitic group of Duida rises in an amphitheatre on the right bank of the river. This mountain, which the missionaries call a volcano, is nearly 8000 feet high. Perpendicular on the south and the west, it has an aspect of solemn greatness; its summit is bare and stony, but, whenever it's less steep declivities are covered with mould, vast forests appear suspended on its flanks. At the foot of Duida is placed the mission of Esmeralda, a little hamlet with eighty inhabitants, surrounded by a lovely plain, bathed by rills of black, but limpid
waters. This is a real meadow, decorated with clumps of the mauritia palm, which is the sago-tree of America. Nearer the mountain, the distance of which from the Cross of the mission I found to be 7300 toises, the marshy plain changes to a savannah, and spends itself along the lower region of the Cordillera. Large pine-apples are there found of a delicious flavour; that species of bromelia always grows solitary among the gramina* like our colchicum autumnale, while the karatas, another species of the same genus, is a social plant, like our whortles and heaths. The pine-apples of Esmeralda are cultivated throughout Guyana. There are certain spots in America, as in Europe, where different fruits attain their highest degree of perfection. The sapota plum (achras) should be eaten at the Island of Margaretta or at Cumana: the chilimoyas (very different from the custard apple, and sweet sop of the West India Islands,) at Loxa, in Peru; the grenadilles, or parchas, at Caraccas; and the pine-apple at Esmeralda, or in the island of Cuba; to find no exaggeration in the praises, which the first travellers bestowed on the excellence of the productions of the torrid

* The country round Esmeralda abounds in gramineæ and cyperaceæ; setaria composita, paspalum conjugatum, pariana campestris, mariscus lavis, juncus floribundus, elionurus ciliaris, chioetospora capitata.
zone. The pine-apple forms the ornament of the fields near the Havannah, where it is planted in parallel rows; on the sides of the Duida it embellishes the turf of the savannahs, lifting its yellow fruit, crowned with a bunch of silvery leaves, above the setaria, the paspalum, and a few cyperaceae. This plant, which the Indians of the Oroonoko call ana-curua, has been propagated ever since the sixteenth century in the interior of China*, and some English travellers found it recently, together with other plants indubitably American, (maize, cassava, tobacco, and pimento) on the banks of the Rio Congo, in Africa.

There is no missionary at Esmeralda; the monk, appointed to celebrate mass in that hamlet, is settled at Santa Barbara, more than fifty leagues distant. It requires four days to go up the river; and he therefore visits this spot but five or six times in a year. We were cordially received by an old officer, who took us for Catalanian shopkeepers, whom our little trade had led to the missions. On seeing packages of paper for the purpose of drying our plants, he smiled at our simple ignorance. "You come,"

said he, "to a country, where this kind of merchandize has no sale; we write little here; and the dried leaves of maize, the *platano* (plantain tree), and the *vijaho* (heliconia), serve us, like paper in Europe, to wrap up needles, fish hooks, and other little articles, of which we are careful." This old officer united in his person the civil and ecclesiastical authority. He taught the children, I will not say the Catechism, but the Rosary; he rang the bells to amuse himself; and, impelled by an ardent zeal for the service of the church, sometimes used his chorister's wand in a manner not very agreeable to the natives.

Notwithstanding the extreme smallness of the mission, three Indian languages are spoken at Esmeralda; the Idapimanare, the Catarapenno, and the Maquiritan. The last of these prevails in the Upper Oroonoko, from the confluence of the Ventuari as far as that of the Padamo*; as the Caribbee does in the Lower Oroonoko; the Otomac, near the confluence of the Apure; the Tumanac and the Maypure, at the Great Cataracts; and the Maravitan, on the banks of the Rio Negro. These are the five, or six lan-

* The Arivirianoes of the banks of the Ventuario speak a dialect of the language of the Maquiritares. The latter live jointly with a tribe of the Macoes in the savannahs, that are traversed by the Padamo. They are so numerous, that they have even given their name to this tributary stream of the Oroonoko. (See the great map of La Cruz.)
guages most generally spoken. We were surprised to find at Esmeralda many zamboes, mulattoes, and copper-coloured people, who call themselves Espannoles, and fancy they are white, because they are not so red as the Indians. These people live in the most absolute want; they have for the most part been sent hither in banishment (desterrados). Solano, in his haste to found colonies in the interior of the country, in order to guard it's entrance against the Portugueze, assembled in the Llanos, and as far as the island of Margareta, vagabonds and malefac-tors, whom justice had vainly pursued, and made them go up the Oroonoko to join the unhappy Indians, who had been carried off from the woods. A mineralogical error gave celebrity to Esmeralda. The granites of Duida and Maraguaca contain in open veins fine rock crystals, some of them of great transparency, others coloured by chlorit, or blended with actinote; and they were taken for diamonds and emeralds.

So near the sources of the Oroonoko, we heard of nothing in these mountains but the proximity of El Dorado, the lake Parima, and the ruins of the great city of Manoa. A man, still known in the country for his credulity and his love of exaggeration, don Apollinario Diez de la Fuente, assumed the pompous title of capitan poblador, and cabo militar of the fort of Cassiquiare. This fort consisted of a few trunks
of trees, joined together by planks; and, to complete the deception, a demand was made at Madrid of the privileges of a villa for the mission of Esmeralda, which was but a hamlet with twelve or fifteen huts. It is to be feared, that don Apollinario, who was afterward governor of the province of Los Quixos*, had some influence in the construction of the maps of La Cruz and Surville. Knowing simply the points of the compass, he did not hesitate, in the numerous memoirs which he sent to the court, to style himself the cosmographer of the expedition of the boundaries.

While the chiefs of that expedition were well persuaded of the existence of the Nueva Villa de Esmeraldas, and of the mineral riches of the Cerro Duida, which contains only mica, rock-crystal, actinote, and ruthile (titanite), a colony composed of elements altogether heterogeneous, perished by degrees. The vagabonds of the Llanos had as little taste for labour as the natives, who were compelled to live "within the sound of the bell." The former found a motive in their pride, to justify their indolence. In the missions, every mulatto, who is not decidedly black as an African, or copper-coloured as an Indian, calls himself a Spaniard; he belongs to the gente de razón, the race endued with reason;

* Dependent on the kingdom of Quito.
and that reason, sometimes, it must be admitted, arrogant and indolent, persuaded the whites, and those who fancy they are so, that to till the ground is the task of slaves, of poitos and of the native neophytes. The colony of Esmeralda had been founded according to the principles of that of New Holland; but it was far from being governed with the same wisdom. The American colonists, being separated from their native soil, not by seas, but by forests intermixed with savannahs, dispersed; some taking the road to the north, toward the Caura and the Carony; others proceeding south to the Portugalueze possessions. Thus the celebrity of this villa, and of the emerald mines of Duida, vanished in a few years, and Esmeralda, on account of the immense number of insects that obscure the air at all seasons of the year, was regarded by the monks as a place of banishment and malediction.

I mentioned above, that the superior of the missions, when he would make the lay brothers return to their duty, menaces sometimes to send them to Esmeralda; "that is," say the monks, "to be condemned to the moschettoes; to be devoured by those buzzing flies (zancudos gritones), with which God has peopled the earth to chastise man*." Such strange punishments have

* "Estos mosquitos que llaman zancudos gritones que parece los cria la naturaleza para castigo y tormento de los hombres." (Fray Pedro Simon. p. 481.)
not always affected solely the lay brothers. There happened in 1788 one of those monastic revolutions, of which it is difficult to form a conception in Europe, according to the ideas that prevail of the peaceful state of the Christian settlements in the New World. During a long time the monks of the order of St. Francis, settled in Guyana, had been desirous of forming a separate republic, and rendering themselves independent of the college of Piritu at Nueva Barcelona. Discontented with the election of Fray Gutierrez de Aguilera, chosen by a general chapter, and confirmed by the king in the important office of president of the missions, five or six monks of the Upper Oroonoko, the Cassiquiare, and the Rio Negro, assembled together at San Fernando de Atabapo; chose hastily a new superior from their own body; and caused the old one, who, unfortunately for himself, had come to visit those countries, to be seized. They put him in irons, threw him into a boat, and conducted him to Esmeralda, as to a place of proscription. The great distance of the coast from the theatre of this revolution led the monks to hope, that their crime would remain long unknown beyond the Great Cataracts. They wished to gain time to intrigue, to negotiate, to frame acts of accusation, and employ the little artifices, by which, in every country, the invalidity of a first election is proved. The ancient
superior groaned in his prison at Esmeralda, and fell dangerously ill from the double influence of the excessive heat, and the continual irritation of the *moschettoes*. Happily for fallen power the monks did not remain united. A missionary of the Cassiquiare conceived serious alarms on the issue of this affair; he dreaded being sent a prisoner to Cadiz, or, as they say in the colonies, *baxo partido de registro*; fear made him change his party, and he suddenly disappeared. Indians were placed on the watch at the mouth of the Atabapo, at the Great Cataracts, and wherever the fugitive was likely to pass in order to reach the Lower Oroonoko. Notwithstanding these precautions, he arrived at Angostura, and thence reached the college of the missions of Piritu; denounced his colleagues; and was appointed, in recompense of this information, to arrest those with whom he had conspired against the president of the missions*. At Esmeralda, where the political events that have agitated

* Two of the missionaries, considered as the leaders of the insurrection were embarked at Angostura, in order to be tried in Spain. The vessel in which they were conveyed became leaky, and put into Spanish Harbour in the island of Trinidad. The governor Chacon interested himself in the fate of the monks; they were pardoned, a sally of vivacity somewhat contrary to monastic discipline, and were again employed in the missions. I was acquainted with them both during my abode in South America.
Europe for thirty years past have not yet been heard of, a lively interest is still preserved for what is called *el alboroto de los frailes* (the sedition of the monks). In this country, as in the East, no conception is formed of any other revolutions than those that are made by the governors themselves; and we have just seen, that the effects are not very alarming.

If the *villa* of Esmeralda, with a population of twelve or fifteen families, be at present considered as a frightful abode, this must be attributed to the want of cultivation, the distance from every other inhabited country, and the excessive quantity of moschettoes. The site of the mission is highly picturesque; the surrounding country is lovely, and of great fertility. I never saw clusters of plaintains of so large a size as these; and indigo, sugar, and cacao might be produced in abundance, if any trouble were taken for their cultivation. The Cerro Duida is surrounded with fine pasturage; and, if the Observantins of the college of Piritu partook a little of the industry of the Catalonian Capuchins settled on the banks of the Carony, numerous herds would be seen wandering between the Cunucunumo and the Padamo. In the present state of things, not a cow or a horse is to be found; and the inhabitants, victims of their own indolence, are often reduced to eat hams of alouate monkies, and flour of the bones of fish, of which I shall have
occasion to speak hereafter. A little cassava and a few plantains only are cultivated; and when the fishery is not abundant, the natives of a country so favoured by nature are exposed to the most cruel privations.

The pilots of the small number of boats, that go from the Rio Negro to Angostura by the Cassiquiare, being afraid to ascend as far as Esmeralda, this mission would have been much better placed at the point of the bifurcation of the Oroonoko. It is probable, that this vast country will not always be doomed to the desertion in which it has hitherto been left from the errors of monkish administration, and the spirit of monopoly that characterises corporations. We may even predict on what points of the Oroonoko industry and commerce will become most active. In every zone, population is concentrated at the mouth of tributary streams. The Rio Apure, by which the productions of the provinces of Varinas and Merida are exported, will give great importance to the little town of Cabruta, which will then be in rivalship with San Fernando de Apure, where all commerce has hitherto centred. Higher up, a new settlement will be formed at the confluence of the Meta, which communicates with New Grenada by the Llanos of Casanare. The two missions of the Cataracts will increase from the activity, to which the transport of oats at those points will
give rise; for, an unhealthy and damp climate, and the excessive abundance of moschettoes, will as little impede the progress of cultivation at the Oroonoko, as at the Rio Magdalena, whenever a powerful mercantile interest shall call new planters thither. Habitual evils are those which are least felt; and men born in America do not suffer the same intensity of pain as Europeans recently arrived. Perhaps also the destruction of forests round the inhabited places, although slow, will a little diminish the cruel torment of the tipulary insects. San Fernando de Atabapo, Javita, San Carlos, and Esmeralda, appear (from their situation at the mouth of the Guaviare, the portage between Tuamini and the Rio Negro, the confluence of the Cassiquiare, and the point of bifurcation of the Upper Oroonoko) to promise a considerable increase of population and prosperity. The same circumstances will take place in the fertile but uncultivated countries, through which flow the Guallaga, the Amazon, and the Oroonoko; as well as at the isthmus of Panama, the lake of Nicaragua, and the Rio Huasacualco, which furnish a communication between the two seas. The imperfection of political institutions may for ages have converted places, where the commerce of the world should be found concentrated, into deserts; but the time approaches, when these obstacles will exist no longer. A vicious administration cannot always
struggle against the united interests of men; and civilization will be carried insensibly into those countries, the great destinies of which nature itself proclaims, by the physical configuration of the soil, the immense windings of the rivers, and the proximity of two seas, that bathe the coasts of Europe and of India.

Esmeralda is the most celebrated spot on the Oroonoko for the fabrication of that active poison *, which is employed in war, in the chase, and, what is singular enough, as a remedy for gastric obstructions. The poison of the ticunas of the Amazon, the upa-stieute of Java, and the curare of Guyana, are the most deleterious substances that are known. Raleigh†, toward the end of the sixteenth century, had heard the name of urari pronounced as being a vegetable substance, with which arrows were envenomed; yet no fixed notions of this poison had reached Europe. The missionaries Gumilla and Gili had not been able to penetrate into the country, where the curare is manufactured. Gumilla asserts, that "this preparation was enveloped in great mystery; that it’s principal ingredient was furnished by a subterraneous plant, by a tuberose-root, which never puts forth leaves, and which is called the root, by way of eminence,

* In Tamanac, marana, in Maypure, macuri.
raiz de si misma; that the venomous exhalations, which arise from the pots, cause the old women (the most useless) to perish, who are chosen to watch over this operation; finally, that these vegetable juices never appear sufficiently concentrated, till a few drops produce at a distance a repulsive action on the blood. An Indian wounds himself slightly; and a dart, dipped in the liquid curare, is held near the wound. If it make the blood return to the vessels without having been brought into contact with them, the poison is judged to be sufficiently concentrated.” I shall not stop to refute these popular tales collected by Father Gumilla. Why indeed should this missionary have hesitated to admit the action of the curare at a distance, when he had no doubt of the properties of a plant, which caused vomiting or purging, according as the leaves had been torn upward or downward from their stem*?

When we arrived at Esmeralda, the greater part of the Indians were returning from an ex-

* “Llamo la atencion de los Fisicos sobre el frayleccillo ó la tuatua (œn euphorbiacea). Quantas ojas comiere, tantas evacuaciones ha de expeler. Si arranca las ojas tirano acia abaxo, cada oja causa una evacuacion; si las arranca hacia arriba, causan vomitos; y si arrancan unas para arriba y otras acia abaxo, concurre uno y otro efecto.” Gumilla, vol. ii, p. 298, Caulin, p. 29.
cursion, which they had made to the east beyond the Rio Padamo, to gather juvias, or the fruit of the bertholletia, and the liana which yields the curare. Their return was celebrated by a festival, which is called in the mission la fiesta de las juvias, and which resembles our harvest homes and vintage feasts. The women had prepared a quantity of fermented liquor, and during two days the Indians were in a state of intoxication. Among nations that attach great importance to the fruits of the palm-trees, and of some others useful for the nourishment of man, the period when these fruits are gathered is marked by public rejoicings, and time is divided according to these festivals, which succeed one another in a course invariably the same. We were fortunate enough to find an old Indian less drunk than the rest, who was employed in preparing the curare poison from freshly-gathered plants. He was the chemist of the place. We found at his dwelling large earthen pots for boiling the vegetable juice, shallower vessels to favour the evaporation by a larger surface, and leaves of the plaintain tree rolled up in the shape of our filters, and used to filtrate the liquids, more or less loaded with fibrous matter. The greatest order and neatness prevailed in this hut, which was transformed into a chemical laboratory. The Indian, who was to instruct us, is known throughout the mission by the name of the master
of poison (amo del curare); he had that self-sufficient air and tone of pedantry, of which the pharmacopolists of Europe were formerly accused. "I know," said he, "that the whites have the secret of fabricating soap, and that black powder, which has the defect of making a noise, and killing animals, when they are wanted. The curare, which we prepare from father to son, is superior to any thing you can make down yonder (beyond sea). It is the juice of an herb, which kills silently (without any one knowing whence the stroke comes)."

This chemical operation, to which the master of the curare attached so much importance, appeared to us extremely simple. The liana (bejuco), which is used at Esmeralda for the preparation of the poison, bears the same name as in the forests of Javita. It is the bejuco de mavacure, which is gathered in abundance east of the mission, on the left bank of the Oroonoko, beyond the Rio Amaguaca, in the mountainous and granitic lands of Guanaya and Yumariquin. Although the bundles of bejuco, which we found in the hut of the Indian, were entirely destitute of leaves, we had no doubt of their being produced by the same plant of the strychnos family (nearly allied to the rouhamon of Aublet), which we had examined in the forest of Pimichin*.

* See above p. 280. I shall here insert the description of
The mava
cure is employed fresh or dried indif-
the curare, or bejuco de Mava
cure, taken from a manuscript, 
yet unpublished of my learned fellow labourer Mr. Kunth, 
corresponding member of the Institute. "Ramuli lignosi, 
oppositi,ramulo altero abortivo,teretiusculi,fuscescenti-tomen-
tosi, inter petiolos lineola pilosa notati, gemmula aut processu 
filiformi (pedunculo ?) terminati. Folia opposita, breviter pe-
tiolata, ovato-oblonga, acuminata, integerrima, reticulato-trip-
linervia,nervo medio subtus prominentemembranacea, ciliata, 
urinque glabra,nervo medio fuscescenti-tomentoso,lacte viridia, 
Subtus pallidiora, 1\frac{1}{2}-2\frac{1}{2} pollices longa, 8-9 linea
slata. Petioli 
lineam longi,tomentosi,inarticulati." Mr.Kunth adds,The curare 
cannot be a species of the genus phyllantus, because the leaves 
of the latter are alternate,and provided with two stipulae,while 
in the curare the leaves are opposite, and without any trace of 
stipulae. The idea of Mr. Willdenow, that the curare belongs 
to the genus coriaria, of which the berries only are poisonous, 
is altogether as little admissible. The leaves of the coriaria are 
somewhat fleshy, and sometimes alternate; in the curare they 
are membranous, and constantly opposite to each other. The 
petiolke, in the coriaria, are perceptibly articulated to the 
branches, and fall off easily in the dried specimens: the curare, 
on the contrary, shows no articulation. The small gemmulae, 
which de Jussieu mentions in describing the coriaria in his Fa-
milies of Plants, are not found in the curare. Finally, the young 
branches are angular in the coriaria,and cylindrical in the curare. 
They have in the latter, a tendency to stretch out spirally as 
in the rouhamon of Aublet (lasiostoma, Willd.). It is to 
this last genus I would assimilate the curare; for the real 
strychnae appear to belong exclusively to the East Indies. 
We find in the curare a row of small hairs between each pair 
of petiolae; and this character, long since observed in the 
strychnae, which are known for their deleterious properties, is 
of great weight in the comparison, which we think ourselves 
justified in making between such venomous plants."
ferently during several weeks. The juice of the liana, when it has been recently gathered, is not regarded as poisonous; perhaps it acts in a sensible manner only when it is strongly concentrated. It is the bark and a part of the alburnum, which contain this terrible poison. Branches of the mavacure 4 or 5 lines in diameter are scraped with a knife; and the bark that comes off is bruised, and reduced into very thin filaments, on the stone employed for grinding cassava. The venomous juice being yellow, the whole fibrous mass takes this colour. It is thrown into a funnel nine inches high, with an opening 4 inches wide. This funnel was of all the instruments of the Indian laboratory that of which the master of poison seemed to be most proud. He asked us repeatedly, if por allà (down yonder, that is in Europe) we had ever seen anything to be compared to his embudo. It was a leaf of the plantain-tree rolled up in the form of a cone, and placed in another stronger cone made of the leaves of the palm-tree. The whole of this apparatus was supported by slight frame work made of the petioli and ribs of palm-leaves. A cold infusion is first prepared by pouring water on the fibrous matter, which is the ground bark of the mavacure. A yellowish water filters during several hours, drop by drop, through the leafy funnel. This filtered water is the venomous liquor, but it acquires strength only when it
is concentrated by evaporation, like melasses, in a large earthen pot. The Indian from time to time invited us to taste the liquid; it's taste, more or less bitter, decides when the concentration by fire has been carried sufficiently far. There is no danger in this operation, the curare being deleterious only when it comes into immediate contact with the blood. The vapors therefore, that are disengaged from the pans, are not hurtful, notwithstanding what has been asserted on this point by the missionaries of the Oroonoko. Fontana, in his fine experiments on the poison of the ticunas of the river of Amazons, long ago proved, that the vapours rising from this poison, when thrown on burning charcoal, may be inhaled without apprehension; and that it is false as M. de La Condamine has announced, that Indian women, when condemned to death, have been killed by the vapours of the poison of the ticunas.

The most concentrated juice of the mavacure is not thick enough to stick to the darts. It is therefore only to give a body to the poison, that another vegetable juice, extremely glutinous, drawn from a tree with large leaves, called kiracaguero, is poured into the concentrated infusion. As this tree grows at a great distance from Esmeralda, and was at that period as destitute of flowers and fruits as the bejuco de mavacure, we could not determine it botani-
cally. I have several times mentioned that kind of fatality, which withholds the most interesting plants from the examination of travellers, while thousands of others, of the chemical properties of which we are ignorant, are found loaded with flowers and fruits. In travelling rapidly, even within the tropics, where the flowering of the ligneous plants is of such long duration, scarcely an eighth of the trees can be seen furnishing the essential parts of fructification. The chances of being able to determine, I do not say the family, but the genus and species, is consequently as 1 to 8; and it may be conceived, that this unfavourable chance is felt most powerfully, when it deprives us of the intimate knowledge of objects, which afford a higher interest than that of descriptive botany.

At the instant when the glutinous juice of the kiracaguero tree is poured into the venomous liquor well concentrated, and kept in a state of ebullition, it blackens, and coagulates into a mass of the consistence of tar, or of a thick sirup. This mass is the curare of commerce. When we hear the Indians say, that the kiracaguero is as necessary as the bejuco de mavacure to the fabrication of the poison, we may be led into error, supposing, that the former also contains some deleterious principle, while it only serves (as the algarobbo, or any other gummy substance would do), to give more body
the concentrated juice of the curare. The change of colour, which the mixture undergoes, is owing to the decomposition of a hydruret of carbon; the hydrogen is burned, and the carbon is set free. The curare is sold in little calebashes; but it's preparation being in the hands of a few families, and the quantity of poison attached to each dart being extremely small, the curare of the first quality, that of Esmeralda and Mandavaca, is sold at a very high price. I have seen 5 or 6 francs paid for two ounces. This substance, when dried, resembles opium; but it attracts humidity powerfully, when it is exposed to the air. Its taste is of an agreeable bitter, and M. Bonpland and myself have often swallowed small portions of it. There is no danger in so doing, if it be certain, that neither lips nor gums bleed. In the recent experiments made by Mr. Mangili on the venom of the viper, one of his assistants swallowed all the venom that could be extracted from four large vipers of Italy, without being affected by it*. The Indians consider the curare, taken internally, as an excellent stomachic. The same poison prepared by the Piraoas and Salivas†, though it has some celebrity, is not

* Giornale di Fisica e di Chimica, vol. ix, p. 458.
† The Cabres, or Caveres, before their almost total destruction, were also much addicted to the fabrication of the curare.
so much esteemed as that of Esmeralda. The process of this preparation appears to be everywhere nearly the same; but there is no proof that the different poisons sold by the same name at the Oroonoko and the Amazon are identical, and drawn from the same plants. Mr. Orfila therefore, in his excellent work on *general Toxicology*, has very judiciously separated the woorara of Dutch Guyana, the curare of the Oroonoko, the ticuna of the Amazon, and all those substances, which have been too vaguely united under the name of *American poisons*.* Perhaps some future day one and the same alkaline principle, similar to the morphin of opium, and the vauquelin of the strychnos, will be found in venomous plants, which belong to different genera.

At the Oroonoko, the curare *de raix* (of the root) is distinguished from the curare *de bejüco* (of lianas, or of the bark of branches). We saw only the latter prepared; the former is weaker, and much less esteemed. At the river of the Amazons we learned to distinguish the poisons of the Ticuna, Yagua, Peva, and Xibaro Indians, which, proceeding from the same plant, perhaps differ only by a more or less careful preparation. The *toxique des Ticunas*, to which M.

de la Condamine has given so much celebrity in Europe, and which begins to bear the name of ticuna, somewhat improperly, is extracted from a liana, that grows in the island of Mormorote, in the Upper Maragnon. This toxique belongs partly to the Ticunas, who remain independant on the Spanish territory near the sources of the Yacarique; and partly to Indians of the same tribe, inhabiting the Portugueze mission of Loreto. Poisons being indispensables in those climates to the existence of hunting nations, the missionaries of the Oroonoko and the Amazon seldom oppose this kind of manufacture. The poisons we have just named differ totally from that of La Peca*, and from the poison of Lamas and of Moyobamba. I enter into these details, because the vestiges of plants, which we were able to examine, proved to us (contrary to the common opinion), that the three toxiques of the Ticunas, of La Peca, and of Moyobamba, are not taken from the same species, probably not even from congeneric plants. In proportion as the preparation of the curare is simple, that of the poison of Moyobamba is long and complicated. With the juice of the bejucodéambihuasca, which is the principal ingredient, are mixed pimento (capsicum), tobacco, barbasco (jacquinia armillaris), sanango (tabernæmon-

* A village of the province of Jaen de Bracamoros.
tana), and the milk of some other apocyneæ. The fresh juice of the *amblahuasca* exerts a deleterious action, if it touch the blood*; the juice of the *mavacure* is a mortal poison only when it is concentrated by fire; and ebullition deprives the juice of the root of *jatropha manihot* (*yucca amarga*) of all its baneful qualities. In rubbing a long time between my fingers the liana which yields the cruel poison of La Peca, when the weather was excessively hot, my hands were benumbed; and a person who was employed with me felt the same effects from this rapid absorption by the uninjured integuments.

I shall not here enter into any detail on the physiological properties of those poisons of the New World, which kill with the same promptitude as the strychnæ of Asia (the vomit nut, the upasteieutæ, and the bean of Saint Ignatius), but without producing vomiting when they are received into the stomach, and without announcing the approach of death by the violent excitement of the spinal marrow. During our abode in America, we sent some *curare* of the Oroonoko, and joints of bamboo filled with the poison of the Ticunas and of Moyobamba, to Mr. Fourcroy and Mr. Vauquelin; and, after our return, we also furnished Mr. Magendie and

* Manuscript notes of Mr. Andivieles, an inhabitant of Lamas.
Mr. Delille, who have employed themselves so usefully on the *toxiques* of the torrid zone, with curare enfeebled by being transported through damp countries. Scarcely a fowl is eaten on the banks of the Oroonoko, which has not been killed with a poisoned arrow. The missionaries pretend, that the flesh of animals is never so good, as when these means are employed. Father Zea, who accompanied us, though ill of a tertian fever, caused every morning the live fowl allotted for our repast, to be brought to his hammock together with an arrow. Notwithstanding his habitual state of weakness, he would not confide this operation, to which he attached great importance, to any other person. Large birds, a guan (*pava de monte*) for instance, or a curassoa (*alector*), when wounded in the thigh, perish in two or three minutes; but it is often ten or twelve before a pig or a pecari expires. M. Bonpland found, that the same poison, bought in different villages, varied much. We had procured at the river of Amazons some real *toxique* of the Ticuna Indians, which was weaker than all the varieties of the *curare* of the Oroonoko. It would be useless to tranquillize travellers respecting the apprehensions, which they often testify at their arrival in the missions, on learning that the fowls, monkeys, guanas, and even the fish which they eat, have been killed with poisoned arrows.
These fears vanish by habit and reasoning. Mr. Magendie has even proved by ingenious experiments on transfusion, that the blood of animals, in which the bitter strychnoses of India have produced a deleterious effect, has no fatal action on other animals. A dog received a considerable quantity of poisoned blood into his veins without any trace of irritation being perceived in the spinal marrow*.

I placed the most active curare in contact with the crural nerves of a frog, without perceiving any sensible change in measuring the degree of irritability of the organs, by means of an arc formed of heterogeneous metals. Galvanic experiments succeeded upon birds, some minutes after I had killed them with a poisoned arrow. These observations are not uninteresting, when we recollect, that a solution of the upas tieute poured upon the sciatic nerve, or insinuated into the texture of the nerve, produces also a sensible effect on the irritability of the organs by immediate contact with the medullary substance†. The danger of the curare, as of most of the other strychnæ, (for we continue to believe, that the mavacure belongs to a neighbouring family,) results only from the action of the poison on the vascular system. At May-

† Raffeneau-Delille, sur le Poison de Java, 1809. p. 15.
pures, a **Zambo**, descended from an Indian and a Negro, prepared for Mr. Bonpland some of those poisoned arrows, that are placed in sarbacans to kill small monkeys or birds. He was a carpenter of remarkable muscular strength. Having had the imprudence to rub the *curare* between his fingers after being slightly wounded, he fell on the ground seized with a vertigo, that lasted nearly half an hour. Happily it was only weakened *curare* (*destemplado*), which is used for very small animals, that is, for those which it is pretended can be recalled to life by putting muriat of soda into the wound. During our voyage in returning from Esmeralda to Atures, I escaped myself an imminent danger. The *curare*, having imbibed the humidity of the air, had become fluid, and was spilt from an ill-closed vessel upon our linen. They who washed the linen had neglected to examine the inside of a stocking, which was filled with *curare*; and it was only on touching this glutinous matter with my hand, that I was warned not to draw on the poisoned stocking. The danger was so much the greater, as my feet at that time bled from the wounds made by chegoes (*pulex penetrans*), which had been ill extirpated. This incident may remind travellers of the prudence requisite in the conveyance of poisons.

A fine chemical and physiological investigation remains to be accomplished in Europe on
the *toxiques* of the New World, when, by more frequent communications, the *curare de bejuco*, the *curare de raiz*, and the various poisons of the Amazon, Guallaga, and Brazil, can be procured, without being confounded together, from the places where they are prepared. Chemists having discovered the pure hydrocyanic acid*, and so many new substances eminently deleterious, the introduction of poisons prepared by savage nations will be less feared in Europe; we cannot however appeal too strongly to the vigilance of those, who in the midst of very populous cities (the centres of civilization, misery, and depravity) preserve such noxious substances. Our botanical knowledge of the plants employed in making poison can be but very slowly acquired. Most of the Indians, who addict themselves to the fabrication of poisoned arrows, are totally ignorant of the nature of the venomous substances, which they receive from other people. A mysterious veil everywhere covers the history of *toxiques* and of antidotes. Their preparation among the sa-

* M. Gay-Lussac observes, that this acid, for the fine discovery of which we are indebted to him, cannot become very dangerous to society, because its smell betrays its presence, and because the facility with which it is decomposed makes it difficult to preserve.

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vages is the monopoly of the *piaches*, who are at once priests, jugglers, and physicians; it is only from the natives transplanted to the missions, that any certain notions can be acquired on matters so problematical. Ages had elapsed before the Europeans were taught to know, from the investigations of Mr. Mutis, the *bejuco del guaco* (*mikania guaco*), which is the most powerful of all antidotes against the bite of serpents, and of which we were fortunate enough to give the first botanical description.

The opinion is very general in the missions, that no cure is possible, if the *curare* be fresh, well concentrated, and have staid long in the wound, so as to have entered abundantly into the circulation. Among the specifics employed on the banks of the Oroonoko, and, according to Mr. Leschenault, in the Indian Archipelago, the most celebrated is muriat of soda†. The

* See pl. 105 of the *Plantes Equinoxiales*, which I published conjointly with Mr. Bonpland, vol. ii, p. 84.

† Oviedo (*Sommario delle Indie Orientali*) boasts of sea water as an antidote against vegetable poisons. The people in the missions never fail to relate to European travellers, that they have no more to fear from arrows dipped in *curare*, if they have a little salt in their mouth, than from the electric shocks of the gymnoti, when chewing tobacco. (See chap. 17, vol. iv, p. 347.) Raleigh recommends as an antidote to the *ourari* (*curare*) the juice of garlick. (Cayley, vol. i, p. 196.)
wound is rubbed with this salt, which is also taken internally. I had myself no direct and sufficiently convincing proof of the action of this specific. The experiments of Messrs. De-lille and Magendie rather make against its utility. On the banks of the Amazon, the preference among the antidotes is given to sugar; and the muriat of soda being a substance almost unknown to the Indians of the forests, it is probable, that the honey of bees, and that farinaceous sugar, which oozes from plantains dried in the sun, were anciently employed throughout Guyana. In vain have ammonia and eau de luce been tried against the curare; it is now known how uncertain these pretended specifics are, even when applied to wounds caused by the bite of serpents. Sir Everard Home* has shewn, that a cure is often attributed to a remedy, when it is owing only to the slightness of the wound, and to a very circumscribed action of the toxique. Animals may with impunity be wounded with poisoned arrows, if the wound be well laid open, and the point imbued with poison be withdrawn immediately after the wound is made. If salt or sugar be employed in these cases, people are tempted to take it for an excellent specific. Indians, who had been wounded in battle by

* Philos. Trans., 1810, Part I, p. 75.
weapons dipped in the *curare*, described to us the symptoms of being poisoned as entirely similar to those observed in the bite of serpents. The wounded person feels congestions in the head; and vertigoes that compel him to seat himself on the ground. He feels nausea, vomits repeatedly; and, while he is tormented by a raging thirst, numbness seizes all the parts that are near the wound.

The old Indian, who was called the *master of poison*, seemed flattered by the interest we had taken in his chemical processes. He found us sufficiently intelligent to have no doubt, that we knew how to make soap, and, next to the fabrication of *curare*, this art appeared to him one of the finest inventions of the human mind. When the liquid poison was poured into the vessels prepared for this purpose, we accompanied the Indian to the festival of the *juvias*. The harvest of *juvias*, or fruits of the *bertholletia excelsa*, was celebrated by dancing, and the excesses of the most savage intoxication. The hut, where the natives were assembled, displayed during several days a very singular aspect. There was neither table nor bench, but large roasted monkeys, blackened by smoke, were ranged in order resting against the wall. These were the *marimondes* (*ateles belzebuth*), and those bearded monkeys called *capuchins*, which must not be confounded with the weeper, or sai
(simia capucina of Buffon). The manner of roasting these anthropomorphous animals contributes singularly to render their appearance disagreeable in the eyes of civilized man. A little grating or lattice of very hard wood is formed, and raised one foot from the ground. The monkey is skinned, and bent into a sitting posture; the head generally resting on the arms, which are meagre and long; but sometimes these are crossed behind the back. When it is tied on the grating, a very clear fire is kindled below. The monkey, enveloped in smoke and flame, is broiled and blackened at the same time*. On seeing the natives devour the arm or leg of a roasted monkey, it is difficult not to believe, that this habit of eating animals, that so much resemble man in their physical organization, has, in a certain degree, contributed to diminish the horror of anthropophagy among savages. Roasted monkeys, particularly those that have a very round head, display a hideous resemblance to a child; the Europeans therefore, who are obliged to feed on quadrumanes, prefer separating the head and the hands, and serve up only the rest of

* Soon after my return to Europe, an engraving was published at Weimar from a drawing composed with great spirit by Mr. Schick at Rome, representing one of our resting places on the banks of the Oroonoko. In the foreground some Indians are occupied in roasting a monkey.
the animal at their tables. The flesh of monkeys is so lean and dry, that Mr. Bonpland has preserved in his collections at Paris an arm and hand, which had been broiled over the fire at Esmeralda; and no smell arises from them after a great number of years.

We saw the Indians dance. The monotony of this dance is increased by the women not daring to take a part in it. The men, young and old, form a circle, holding each other’s hands; and turn sometimes to the right, sometimes to the left, for whole hours, with silent gravity. Most frequently the dancers themselves are the musicians. Feeble sounds, drawn from a series of reeds of different lengths, form a slow and plaintive accompaniment. The first dancer, to mark the time, bends both knees in a kind of cadence. Sometimes they all make a pause in their places, and execute little oscillatory movements, bending the body from one side to the other. These reeds ranged in a line, and fastened together, resemble the pipe of Pan, as we find it represented in the bacchanalian processions on Grecian vases. To unite reeds of different lengths, and make them sound in succession by passing them before the lips, is a simple idea, and naturally presented itself to every nation. We were surprised to see with what promptitude the young Indians constructed and tuned these pipes, when they found
reeds (carices) on the bank of the river. Men in a state of nature, in every zone, make great use of these gramina with high stalks. The Greeks said with truth, that reeds had contributed to subjugate nations by furnishing arrows, to soften men's manners by the charm of music, and to unfold their understanding by affording the first instruments for tracing letters. These different uses of reeds mark in some sort three different periods in the life of nations. We must admit, that the tribes of the Oroonoko are found at the first step of dawning civilization. The reed serves them only as an instrument of war and of hunting; and the Pan's pipes, of which we have spoken, have not yet, on those distant shores, yielded sounds capable of awakening mild and humane feelings.

We found in the hut allotted for the festival several vegetable productions, which the Indians had brought from the mountains of Guanaya, and which fixed all our attention. I shall only stop here to mention the fruit of the juvia, reeds of a prodigious length, and shirts made of the bark of marima. The almendron, or juvia, one of the most majestic trees of the forests of the New World, was almost unknown before our voyage to the Rio Negro. It begins to be found four days distance east of Esmeralda, between the Padamo and Ocamo, at the foot of the Cerro Mapaya, on the right bank of the Oroonoko.
It is still more abundant on the left bank, at the Cerro Guanaja, between the Rio Amagucaca and the Gehette. The inhabitants of Esmeralda assured us, that in advancing above the Gehette and the Chiguire, the juvia and cacao-trees become so common, that the wild Indians (the Guaicas and Guahariboes blancos) do not disturb the Indians of the missions, when gathering in their harvests. They do not envy them the productions, with which nature has enriched their own soil. Scarcely any attempt has been made to propagate the almendrones in the settlements of the Upper Oroonoko. The indolence of the inhabitants is a greater obstacle than the rapidity, with which the oil becomes rancid in the amygdaliform seeds. We found only three trees at the mission of San Carlos, and two at Esmeralda. These majestic trees, eight or ten years old, had not yet borne flowers. I mentioned above, that Mr. Bonpland had made known the almendrones to the Indians, among the trees that cover the banks of the Cassiquiare, near the rapids of Cananivacari *

Ever since the sixteenth century the seeds with ligneous and triangular teguments, but not the great drupe like a cocoa-nut, which contains the almonds, had been known in Europe.

* See above, p. 409.
I recognise this in an imperfect engraving of Clusius*. This botanist designates them under the name of *almendras del Peru*. They had no doubt been carried, as a very rare fruit, to the Upper Maragnon, and thence, by the Cordilleras, to Quito and Peru. The *Novus Orbis* of Jean de Laet, in which I found the first account of the cow-tree, furnishes also a description and a figure singularly exact of the fruit of the bertholletia. Laet calls the tree totocke, and mentions the *drupe*† of the size of the

*Exoticor.*, lib. 2, cap. 18, p. 44. Clusius distinguishes very properly the *almendras del Peru*, our bertholletia excelsa, or *juvia*, (fructus amygdalæ-nucleo, triangularis, dorso lato, in bina latera angulosa desinente, rugosus, paululum cuneiformis) from the pekea, or amygdala guayauica (*Exot.*, lib. ii, cap. 6, p. 27). Raleigh, who knew none of the productions of the Upper Oroonoko, does not speak of the *juvia*; but it appears, that he first brought to Europe the fruit of the mauritia palm, of which we have so often spoken. (See *Clus. Exot.*, lib. xvi, cap. 4, p. 25. Fructus elegantissimus, squamosus, similis palmae-pini.)

† The following is the remarkable description, for which botanists have scarcely looked in a work merely geographical, published in 1640. "Arbor (ademonic) totocke est valde procera et ramosa: foliis grandibus et quae forma non multum ab ludunt ab ulmi frondibus, obscure viridentibus, nisi quod postica parte nonnihil videntur candidare. Nullos fert flores sed certas gemmas quae colore nihil differunt a foliis, quae sensim crassescunt et protrudunt fructum grandem et mole interdum capitis humani, pene rotundum antica parte nonnihil compressum, cortice ligneo, duro et admodum
human head, which contains the almonds. The weight of these fruits, he says, is so enormous, that the savages dare not enter the forests without covering their heads and shoulders with a buckler of very hard wood. These bucklers are unknown to the natives of Esmeralda, but they also told us of the dangers incurred when the fruit ripens, and falls from a height of fifty or sixty feet. The triangular seeds of the juvia are sold in Portugal and England under the vague name of chesnuts (castanas) or nuts of Brazil and the Amazon; and it was long believed, that, like the fruit of the pekea, they grew on separate stalks. They have furnished an article of a tolerably brisk trade for a cen-

{Laet, p. 632. Compare our Plantes equinoxiales, tom. i, p. 122, Pl. 36.)
tury past to the inhabitants of Grand Para, by whom they are sent either directly to Europe, or to Cayenne, where they are called touka. The celebrated botanist, Mr. Correa de Serra, told us, that this tree abounds in the forests in the neighbourhood of Macapa, at the mouth of the Amazon; that it there bears the name of capucaya; and that the inhabitants gather the almonds, like those of the lecythis, to express the oil. A cargo of almonds of the juvia, brought into Havre, captured by a privateer, in 1807, was employed for the same purpose.

The tree, that yields the chesnuts of Brazil, is generally not more than two or three feet in diameter, but attains one hundred or one hundred and twenty feet in height. It does not resemble the mammeeæ, the star-apple, and several other trees of the tropics, the branches of which (as in the laurel-trees of the temperate zone) rise almost straight toward the sky. The branches of the bertholletia are open, very long, almost entirely bare toward the base, and loaded at their summits with tufts of very close foliage. This disposition of the semicoriaceous leaves, a little silvery beneath, and more than two feet long, makes the branches bend down toward the ground, like the fronds of the palm-trees. We did not see this majestic tree in blossom, it is not loaded with flowers* till it's fifteenth year,

* According to accounts somewhat vague, they are yel-
and they appear about the end of March and the beginning of April. The fruits ripen toward the end of May, and some trees retain them till the end of August. These fruits, which are as large as the head of a child, often twelve or thirteen inches in diameter, make an enormous noise in falling from the tops of the trees. I know nothing more fitted to seize the mind with admiration of the force of organic action in the equinoctial zone, than the aspect of these great ligneous pericarps, for instance, the cocoa-tree of the Maldives (lodoicea) among the monocotyledons, and the bertholletia and the lecythis among the dicotyledons. In our climates the cucurbitaceæ only produce in the space of a few months fruits of an extraordinary size; but these fruits are pulpy and succulent. Between the tropics, the bertholletia forms in less than fifty or sixty days a pericarp, the ligneous part of which is half an inch thick, and which it is difficult to saw with the sharpest instruments. A great naturalist* has already observed, that the wood of fruits attains in general

low, very large, and have some similitude to those of the bombax ceiba. Mr. Bonpland says however, in his botanical journal written on the banks of the Rio Negro, flos violaceus. It was thus the Indians of the river had described to him the colour of the corolla.

a hardness, which is scarcely to be found in the wood of the trunks of trees. The pericarp of the bertholletia has traces of four cells, and I have sometimes found even five. The seeds have two very distinct coverings, and this circumstance renders the structure of the fruit more complicated than in the lecythis, the pekea or caryocar, and the saouvari. The first tegument is osseous, or ligneous, triangular, tuberculated on its exterior surface, and of the colour of cinnamon. Four or five, and sometimes eight of these triangular nuts, are attached to a central partition. As they are loosened in time, they move freely in the large spherical pericarp. The capuchin monkeys (simia chironpotes) are singularly fond of the chesnuts of Brazil; and the noise made by the seeds, when the fruit is shaken as it fell from the tree, excites the appetency of these animals in the highest degree. I have most frequently found only from fifteen to twenty-two nuts in each fruit. The second tegument of the almonds is membranaceous, and of a brown yellow. Their taste is extremely agreeable when they are fresh; but the oil, with which they abound, and which is so useful in the arts, becomes easily rancid. Although at the Upper Oroonoko we often ate considerable quantities of these almonds for want of other food, we never felt any bad effects from so doing. The spherical pericarp of the
bertholletia, perforated at the summit, is not dehiscent; the upper and swelled part of the columella forms (according to Mr. Kunth) a sort of inner cover, as in the fruit of the lecythis, but it seldom opens of itself. Many seeds, from the decomposition of the oil contained in the cotyledons, lose the faculty of germination, before the rainy season, in which the ligneous integument of the pericarp opens by the effect of putrefaction. A tale is very current on the banks of the Lower Oroonoko, that the capuchin and cacajao monkeys (simia chiropotes, and simia melanocephala) place themselves in a circle, and, by striking the shell with a stone, succeed in opening it, to take out the triangular nuts. This operation must be impossible, on account of the extreme hardness and thickness of the pericarp. Monkeys may have been seen busied in rolling along the fruit of the bertholletia, but* though this fruit has a small hole closed by the upper extremity of the columella, nature has not furnished monkeys with the means of opening the ligneous pericarp, as it has of opening the covercle of the lecythis, called in the missions the covercle of the cocoa of the monkeys*. According to the report of several Indians of great veracity, the little glires only,

* La tapa (the covercle) del coco de Monos.
particularly the cavies (the *acuri* and the *lapa*†), by the structure of their teeth, and the inconceivable perseverance with which they pursue their destructive operations, succeed in perforating the fruit of the *juvia*. As soon as the triangular nuts are spread on the ground, all the animals of the forest, the monkeys, the *manaviris*, the squirrels, the cavies, the parrots, and the macaws, hasten thither, to dispute the prey. They have all strength enough to break the ligneous tegument of the seed; they get out the kernel, and carry it to the tops of the trees. "It is their festival also," said the Indians who had returned from the harvest; and on hearing their complaints of the animals you perceive, that they think themselves alone the legitimate masters of the forest.

The frequency of the *juvia* to the east of Esmeralda seems to indicate, that the Flora of the Amazon begins at that part of the Upper Oroonoko, which extends south of the mountains. This is in some sort a new proof of the union of two basins of rivers. M. Bonpland has very clearly shown the means, which should be employed to multiply the *bertholletia excelsa* on the banks of the Oroonoko, the Apure, the Meta, and throughout the province of Venezuela. In those places where this tree grows

† *Cavia agati*, c. *paca.*
naturally, thousands of seeds, the germination of which has just commenced, should be gathered, and placed as in a nursery in boxes filled with the mould, in which they have begun to vegetate. The young plants, sheltered from the rays of the sun by the leaves of musaceæ or of palm-trees, might be transported in canoes or on rafts. It is well known how difficult it is, notwithstanding the use of chlorine, which I have indicated elsewhere, to make seeds with a horny perisperm germinate in Europe; such as the palm-trees, the coffeaceæ, the quinquinas, and the large ligneous nuts, the kernel of which contains an oil that becomes rancid. All these difficulties would be vanquished, if only such seeds were transported, as had germinated under the tree itself. In this manner we succeeded in carrying a great number of very rare plants, for instance, the coumarouna odorâ, or the Tonga bean, from the Cataracts of the Oronoko to Angostura, and spreading them in the surrounding plantations.

One of the four canoes, which had taken the Indians to the gathering of the juvias, was filled in great part with that species of reeds (carices), of which the sarbacans are made. These reeds were from fifteen to seventeen feet long, yet no trace of a knot for the insertion of leaves and branches was perceived. They were quite straight, smooth without, and perfectly cylin-
drical. These carices come from the foot of the mountains of Yumariquin and Guanaja. They are much sought after, even beyond the Oroonoko, by the name of the reeds of Esmeralda. A hunter preserves the same sarbacan during his whole life, and boasts of the lightness and precision of his sarbacan, as we boast of the same qualities in our fire arms. What is the monocotyledonous plant*, that furnishes these admirable reeds? Did we see in fact the inter-nodes (parts between the knots) of a gramen of the tribe of nastoides? or may this carex be perhaps a cyperaceous plant† destitute of knots? I cannot solve this question, or determine to what genus another plant belongs, which furnishes the shirts of marima. We saw on the slope of the Cerra Duida shirt trees fifty feet high‡. The Indians cut off cylindrical pieces two feet in diameter, from which they peel the red and fibrous bark, without making any longitudinal incision. This bark affords them a sort of garment, which resembles sacks of a very coarse

* The smooth surface of the sarbacans sufficiently proves, that they are not furnished by a plant of the family of umbellifera.
† The caricillo del manati, which grows abundantly on the banks of the Oroonoko, attains from eight to ten feet in height.
‡ Arbor ramosissima, foliis oblongis acutis, integerrimis, longe petiolatis, petiolis fuscis.
texture, and without a seam. The upper opening serves for the head; and two lateral holes are cut to admit the arms. The natives wear these shirts of marima in the rainy season: they have the form of the *ponchos* and *ruanas* of cotton, which are so common in New Grenada, at Quito, and in Peru. As in these climates the riches and beneficence of nature are regarded as the primary causes of the indolence of the inhabitants, the missionaries do not fail to say in showing the shirts of *marima*, "in the forests of the Oroonoko garments are found ready made on the trees." We may add to this tale of the shirts the pointed caps, which the spathes of certain palm-trees furnish, and which resemble coarse network*.

At the festival of which we were spectators, the women were excluded from the dance, and every sort of public rejoicing; they were daily occupied in serving the men with roasted monkey, fermented liquors, and the palm cabbage. I mention this last production, which has the taste of our cauliflowers, because in no other country had we seen specimens of such an immense size. The leaves that are not unfolded are confounded with the young stem, and we measured cylinders of six feet long and five inches in diameter. Another substance, which

is much more nutritive, is obtained from the animal kingdom: this is fish flour*. The Indians in all the Upper Oroonoko fry fish, dry them in the sun, and reduce them to powder without separating the bones. I have seen masses of fifty or sixty pounds of this flour, which resembles that of cassava. When it is wanted for eating, it is mixed with water, and reduced to a paste. In every climate the abundance of fish has led to the invention of the same means of preserving them. Pliny and Diodorus Siculus have described the fish bread of the ichthyophagous nations†, that dwelt on the Persian gulf, and the shores of the Red Sea.

At Esmeralda, as everywhere else throughout the missions, the Indians who will not be baptized, and who are merely aggregated in the community, live in a state of polygamy. The number of wives differs much in different tribes;

* Manioc de pescado.

† These nations, in a still ruder state than the natives of the Oroonoko, contented themselves with drying the raw fish in the sun. They made up the fish paste in the form of bricks, and sometimes mixed with it the aromatic seed of palirus (rhamnus), as in Germany, and some other countries of the north, cummin and fennel seed are mixed with wheaten bread. Pliny, lib. 7, cap. 3 (vol. i, p. 374. ed. Par., 1723). Diod. Sic., p. 154. Arrian, Ind., p. 566.
it is most considerable among the Caribbees, and all the nations that have preserved the custom of carrying off young girls from the neighbouring tribes. How shall we speak of domestic happiness in so unequal an association? The women live in a sort of slavery, as they do in most nations in a state of barbarism. The husbands being in the full enjoyment of absolute power, no complaint is heard in their presence. An apparent tranquillity prevails in the house; the women are eager to anticipate the wishes of an imperious and sullen master; and they take care indistinctly of their own children and those of their rivals. The missionaries assert, what may easily be believed, that this domestic peace, the effect of common fear, is singularly disturbed when the husband is long absent. The wife who contracted the first ties then applies to the others the names of concubines and servants. The quarrels continue till the return of the master, who knows how to calm their passions by the sound of his voice, by a mere gesticulation, or, if he think it necessary, by means a little more violent. A certain inequality in the rights of the women is sanctioned by the language of the Tamanacs. The husband calls the second and third wife the companions of the first; and the first treats these companions as rivals and enemies (ipucjatoje), which
is less polite, but more true, and more expressive. The whole weight of labour being supported by these unhappy women, we must not be surprised, if in some nations their number is extremely small. Where this happens, a kind of polyandry is formed, which we find more fully displayed in Thibet, and on the lofty mountains at the extremity of the Indian peninsula. Among the Avanooes and the Maypures, brothers have often but one wife. When an Indian, who lives in polygamy, becomes a Christian, he is compelled by the missionaries, to choose among his wives her whom he prefers, and to reject the others. The moment of separation is the critical moment; the new convert finds the most valuable qualities in the wives he must abandon. One understands gardening perfectly; another knows how to prepare the chiza, an intoxicating beverage extracted from the root of cassava; all appear to him alike necessary. Sometimes the desire of preserving his wives overcomes in the Indian his inclination to Christianity; but most frequently the husband prefers submitting to the choice of the missionary, as to a blind fatality.

The Indians, who from the month of May to that of August take journeys to the east of Esmeralda, to gather the vegetable productions of the mountains of Yumariquin, gave us precise
notions of the course of the Oroonoko to the east of the mission. This part of my itinerary map differs entirely from those that preceded it. I shall begin the description of this country with the granitic group of Duida, at the foot of which we sojourned. This group is bounded on the west by the Rio Tamatama, and on the east by the Rio Guapo. Between these two tributary streams of the Oroonoko, amid the Morichales, or clumps of mauritia palm-trees, which surround Esmeralda, the Rio Sodomoni descends, celebrated for the excellence of the pine apples that grow upon it's banks. I measured on the 22d of May, in the savannah at the foot of Duida, a base of four hundred and seventy-five metres in length; the angle, under which the summit of the mountain appeared at the distance of thirteen thousand three hundred and twenty-seven metres, was still nine degrees. A trigonometrical measurement made with care gave me for Duida (that is for the most elevated peak, which is south-west of the Cerro Maraguaca) two thousand one hundred and seventy-nine metres, or one thousand one hundred and eighteen toises, above the plain of Esmeralda*.

* Base directed toward the summit of Duida, four hundred and seventy-five metres. Double angles of altitude at the two extremities of the base 10° 0' 10", and 18° 38' 0". Height of Duida above the base 2179 metres = 1113 toises
It's height above the level of the ocean is therefore probably near thirteen hundred toises; I say probably, because I had the misfortune to break my barometer before I reached Esmeralda. The rains fell so violently in our resting places, that we could not preserve the instrument from the effects of humidity, and the tube was broken by the unequal dilatation of the wood. I regretted this accident the more, as never had a barometer resisted longer journeys. I had used it during three years in Europe, amid the mountains of Styria, France, and Spain, and in America on the way from Cumana to the Upper Oronoko. The country between Javita, Vasiva, and Esmeralda, is a vast plain; and having opened the barometer in the former two of these places, I do not fear being mistaken in more than fifteen or twenty toises in the absolute height of the savannahs of Sodomoni. The Cerro Duida yields little in height (scarcely eighty or one hundred toises) to the summit* of St. Gothard, or the Silla of Caraccas on the shore of Venezuela. It is indeed considered as a colossal mountain in those countries; and this celebrity gives a precise

= 2605 varas, Cast. Height of Esmeralda above the level of the sea, probably 177 toises, See above, chap. 22, p. 251.

* Le Pettine.
idea of the mean height of Parima and of all the mountains of eastern America. To the east of the Sierra Nevada de Merida, as well as to the south east of the Paramo de las Rosas, none of the chains, that extend in the direction of the latitude, reach the height of the central ridge of the Pyrenees.

The granitic summit of Duida is so nearly perpendicular, that the Indians have vainly attempted the ascent. It is known, that mountains the least elevated are sometimes the most inaccessible. At the beginning and the end of the rainy season small flames, which seem to change their place, are seen on the top of Duida. This phenomenon, which it is difficult to doubt, on account of the agreement in the testimony concerning it, has given this mountain the improper name of a volcano. As it stands nearly alone, it might be supposed, that lightning from time to time sets fire to the brush-wood; but this supposition loses it's probability, when we reflect on the extreme difficulty, with which plants are set on fire in these damp climates. It must be observed also, that these little flames are said to appear often where the rock seems scarcely covered with turf, and that the same igneous phenomena are displayed on days entirely exempt from storms on the summit of Guaraco, or Murcielago, a hill opposite the mouth of the Río Tamatama, on
the southern bank of the Oroonoko. This hill is scarcely elevated one hundred toises above the neighbouring plains. If the assertions of the natives be true, it is probable, that some subterraneous cause exists in Duida and Guaraco, that produces these flames; for they never appear in the lofty neighbouring mountains of Jao and Maraguacca, so often wrapped in electric storms. The granite of the Cerro Duida is full of veins, partly open, and partly filled with crystals of quartz and pyrites. Gaseous and inflammable emanations, either of hydrogen, or of naphtha, may pass through these veins. Of this the mountains of Caramania, of Hindoo-kho, and of Himalaya, furnish frequent examples. We saw the appearance of flames in many parts of eastern America subject to earthquakes, even from secondary rocks, as at Cuchivero near Cumanacoa*. The fire shows itself when the ground, strongly heated by the sun, receives the first rains; or when, after violent showers, the earth begins to dry. The first cause of these igneous phenomena is at immense depths below the secondary rocks, in the primitive formations: the rains, and the decomposition of atmospheric water, act only a secondary part. The hottest springs of the Globe issue immediately from granite†. Petroleum gushes

* See vol. iii. chap. 6, p. 82.
† See vol. iv, chap. 16, pp. 171 and 195.
from mica-schist; and frightful detonations are heard at Encaramada, between the rivers Arauca and Cuchivero, in the midst of the granitic soil of the Oroonoko and the Sierra Parima. Here, as everywhere else on the Globe, the focus of volcanoes is in the most ancient soils; and it appears, that an intimate connection exists between the great phenomena, that heave up and liquify the crust of our planet, and those igneous meteors, which are seen from time to time on its surface, and which from their littleness we are tempted to attribute solely to the influence of the atmosphere.

Duida, though lower than the height assigned to it by popular belief, is however, the most prominent point of the whole group of mountains, that separate the basin of the Lower Oroonoko from that of the Amazon. These mountains lower still more rapidly on the north-east, toward the Purunama, than on the east, toward the Padamo and the Rio Ocamo. In the former direction, the most elevated summits after Duida, are Cuneva, at the sources of the Rio Paru (one of the tributary streams of the Ventuari), Sipapo, Calitamini, which forms one group with Cunavami and the peak of Uniana*. East of Duida, on the right bank of

* See vol. ii, chap. 17, p. 304; chap. 19, p. 469; vol. v, chap. 20, p. 43, 134; chap. 21, p. 167, 175; chap. 23, p
the Oroonoko, *Maravaca*, or Sierra Maraguaca, is distinguished by its elevation, between the Rio Caurimoni and the Padamo; and on the left bank of the Oroonoko rise the mountains of Guanaja and Yumariquin, between the Rios Amaguaca and Gehette. It is almost superfluous to repeat, that the line which passes through these lofty summits (like those of the Pyrenees, the Carpathian mountains, and so many other chains of the ancient continent) is very distinct from the line, that marks the partition of the waters. This latter line, which separates the

375, 451. I never heard the Indians of the Upper Oroonoko name the three mountains, Jujamari, Javi, and Siamacu, which the missionary Gili (vol. i, p. 39, 133, 156; vol. ii, p. 28) indicates as being very lofty, giving at the same time the most confused notions of their geographical situation. Jujamari appears to be north-east of the Cerro de Sipapo, which I have described above; Javi and Siamacu (Chamacu, Samacu), of the existence of which Caulin also was ignorant, are (I believe) between the sources of the Ventuari and the Cuchivero. The natives described Siamacu to father Gili as a very cold place. Now, on a mountain eight hundred toises high, the centigrade thermometer, in that zone, may fall to ten degrees, which causes a feeling of cold very sensible to people habituated to a temperature of twenty-eight or thirty degrees. At Caraccas (height four hundred and fifty-four toises), I saw the thermometer at 12° 5'. The name of Siamacu is perhaps derived from the rounded form of the mountain. This name indicates in Tamanac a vase of hemispheric form, used to keep the *chiza* in.
tributary streams of the Lower and Upper Oroonoko, cuts the meridian of 64° in 4° of latitude. After having separated the sources of the Rio Branco and the Caroni, it runs to the northwest, sending off the waters of the Padamo, the Jao, and the Ventuari, toward the south, and the waters of the Arui, the Caura, and the Cuchivero, toward the north.

The Oroonoko may be ascended without danger from Esmeralda as far as the cataracts occupied by the Guaica Indians, who prevent all ulterior progress of the Spaniards. This is a voyage of six days and half*. In the first two you arrive at the mouth of the Rio Padamo, after having passed, on the north, the little rivers of Tamatama, Sodomoni, Guapo, Caurimoni, and Simirimoni; and on the south, the Cuca, situate between the rock of Guaraco, which is said to throw out flames, and the Cerro Canclilla. In this passage the Oroonoko continues to be three or four hundred toises broad. The tributary streams are most frequent on the right bank,

* From Esmeralda to the mouth of the Rio Padamo, two days; from Padamo to the confluence of the Mavaca, one day and a half; from the Mavaca to the Rio Manaviche, one day; from the Manaviche to the Rio Gehette, or the Raudal of the Guahariboes, one day; in all six days and a half. [The different portions of the voyage added together make but five days and a half, and with this the account in the text agrees. Ed.]
because on this side the river is bounded by the lofty mountains of Duida and Maraguaca, on which the clouds are piled together, while the left bank is low and contiguous to a plain, the general slope of which inclines to the south-west. The northern Cordilleras are covered with fine timber. The growth of plants is such in this ardent and constantly humid climate, that the trunks of the bombax ceiba* are sixteen feet in diameter. The Rio Padamo, or Patamo, by which the missionaries of the Upper Oroonoko communicated heretofore with those of the Rio Caura, has become a source of error to geographers. Father Caulin gives it the name of Ma-coma, and places another Rio Patamo between the point of bifurcation of the Oroonoko and a mountain called Ruida, which is no doubt identically the same with the Cerro Duida. Surville makes the Padamo communicate with the Rio Ocamo (Ucamu), which is entirely independent of it; finally, a small tributary stream of the Oroonoko, on the west of the bifurcation, is indicated in the great map of La Cruz as the Rio Padamo†, and the river that really bears this name is called Rio Maquiritari. From the

* The extraordinary dimensions attained by those species of bombax, which are of very light wood, was known to Cardinal Bembo. *Hist. Ven.*, 1551, fol. 83.

† The Patamo of La Cruz is changed, so as to make it almost Greek, into Potamo, in Arrowsmith's map.
mouth of this river, which is of considerable breadth, the Indians arrive, in a day and half, at the Rio Mavaca, which rises in the lofty mountains of Unturan*, which we have already mentioned. The portage between the sources of this tributary stream and those of the Idapa or Siapa, has given rise to the fable of the communication of the Idapa with the Upper Oroonoko. The Rio Mavaca communicates with a lake, to the banks of which the Portugueze † of the Rio Negro repair, without the knowledge of the Spaniards of Esmeralda, to gather the aromatic seeds of the laurus pucheri, known in trade by the names of the pichurim bean, and toda specie. Between the confluence of the Padamo and that of the Mavaca, the Oroonoko receives on the north the Ocamo, into which the

* See above, chap. 23, p. 376, and 419.

† They enter the Spanish territory by the communication between the Cababurj', and the Pacimoni. The pichurim bean is the puchiri of M: de la Condamine, which abounds at the Rio Xingu, a tributary stream of the Amazon, and on the banks of the Hyurubaxy, or Jurubesh of father Fritz, which runs into the Rio Negro. _Voyage à l'Amazone_, p. 146; and _Corog. Bras._, vol. ii, p. 278, 322, 351. The puchery, or pichurim, which is grated like nutmeg, differs from another aromatic fruit (a laurel ?) known in trade at Grand Para by the names of cucheri, euchiri, or cravo (clavus) do Maranhão, and which, on account of it's smell, is compared with cloves.
Rio Matacona falls. At the sources of the latter live the Guainares, who are much less copper-coloured, or tawny, than the other inhabitants of those countries. This is one of the tribes called by the missionaries fair Indians, or Indios blancos, respecting whom I shall soon treat more at large. Near the mouth of the Ocamo, travellers are shown a rock, which is the wonder of the country. It is a granite passing into gneiss, and remarkable for the peculiar distribution of the black mica, which forms little ramified veins. The Spaniards call this rock Piedra Mapaya (the map-stone). The little fragment which I procured indicated a stratified rock, rich in white feldspar, and containing, beside spangles of mica, which are grouped in streaks, and variously twisted, some crystals of hornblende. It is not a syenite, but probably a granite of new formation, analogous to those, to which the stanniferous granites (hyalomictes), and the pegmatites, or graphic granites, belong.

Beyond the confluence of the Mavaca, the Oroonoko suddenly diminishes in breadth and depth, becoming extremely sinuous like an Alpine torrent. It's two banks are surrounded by mountains, and the number of it's tributary streams on the south augments considerably, yet the Cordillera on the north remains the most elevated. It requires two days to go from the mouth of the Mavaca to the Rio Gi-
hette, the navigation being very inconvenient, and the boats, on account of the want of water, being often dragged along the shore. The tributary streams in this distance are, on the south, the Daracapo and the Amaguaca; which skirt on the west and east the mountains of Guanaya and Yumariquin, where the bertholletias (chestnuts of the Maragnon) are gathered. The Rio Manaviche flows down from the mountains on the north, the elevation of which diminishes progressively from the Cerro Maraguaca. As you continue to go up the Oroonoko, the whirlpools and little rapids (chorros y remolinos) become more and more frequent; on the north lies the Canno Chiquire, inhabited by the Guaicas, another tribe of white Indians; and two leagues distant is the mouth of the Gehette, where there is a great cataract. A dyke of granitic rocks crosses the Oroonoko; these rocks are the columns of Hercules, beyond which no white man has been able to penetrate. It appears, that this point, known by the name of the great Raudal de Guaharibos, is three quarters of a degree west of Esmeralda, consequently in 67° 38' of longitude. A military expedition, undertaken by the commander of the fort of San Carlos, Don Francisco Bovadilla, to discover the sources of the Oroonoko, led to the most minute information we had respecting the cataracts of the Guahariboes. This commander had heard,
that some fugitive Negroes from Dutch Guyana, proceeding toward the west (beyond the isthmus between the sources of the Rio Carony and the Rio Branco), had joined the independant Indians. He attempted an entrada (hostile incursion), without having obtained the permission of the governor; the desire of procuring African slaves, better fitted for labour than the copper-coloured race, was a far more powerful motive than that of zeal for the progress of geography.

I had an opportunity at Esmeralda, and at the Rio Negro, of interrogating several intelligent military men, who had made a part of that expedition. Bovadilla arrived without difficulty as far as the little Raudal * opposite the Gehette; but having advanced to the foot of the rocky dike, that forms the great cataract, he was suddenly attacked, while he was breakfasting, by the Guahariboes and Guaycas, two warlike tribes, celebrated for the activity of the curare, with which their arrows are empoisoned. The Indians occupied the rocks, that rise in the middle of the river, and seeing the Spaniards without bows, and having no knowledge of firearms, they provoked the whites, whom they believed to be without defence. Several of the

* This cataract is called Raudal de abaxo, in opposition to the great Raudal de Guaharibos, which is situate higher up toward the east.
latter were dangerously wounded, and Bovadilla found himself forced to give the signal of battle. A horrible carnage ensued among the natives, but none of the Dutch Negroes, who it was believed had taken refuge in those parts, were found. Notwithstanding a victory so easily won, the Spaniards did not dare to advance toward the east in a mountainous country, and along a river inclosed by very high banks.

The Guahariboes blancos have constructed a bridge of lianas above the cataracts, supported on rocks that rise, as it generally happens in the Pongos of the Upper Maragnon, in the middle of the river. The existence of this bridge*, which is known to all the inhabitants of Esmeralda, seems to indicate, that the Oroonoko is already very narrow at this point. It is generally estimated by the Indians to be only two or three hundred feet broad. They say, that the Oroonoko above the Raudal of the Guahariboes is no longer a river, but a brook (ria-chuelo); while a well-informed ecclesiastic, Fray Juan Gonzales, who had visited those countries, assured me, that the Oroonoko, where it's ulte-

* The Amazon also is passed twice on bridges of wood near it's origin in the lake Lauricocha; first north of Chavín, and then below the confluence of the Rio Aguamirias. These, the only two bridges that have been thrown over the largest river we yet know, are called Puente de Quivilla, and Puente de Guancaybamba.
terior course is no longer known, continues to be two thirds of the breadth of the Rio Negro near San Carlos. This opinion appears to me less probable; but I relate what I have collected, and affirm nothing positively. I know by the numerous measurements which I have taken, how easily we may be deceived in the dimensions of the beds of rivers. In fact, rivers appear more or less broad according as they are surrounded by mountains or plains, free from islets, or full of shoals, swelled by violent rains, or bereft of their waters by long drought. We may recollect also, that the course of the Ganges is unknown to the north of Gangootra; and that, on account of it's little breadth, this point is believed to be very near it's source.

In the rocky dike that crosses the Oroonoko, forming the Raudal of the Guahariboes, Spanish soldiers pretend to have found the fine kind of saussurite (amazon stone), of which we have spoken above. This tradition however is very uncertain; and the Indians, whom I interrogated on the subject, assured me, that the green stones, called piedras de Macagua* at Esmeralda, were purchased from the Guaicas and

* See above, p. 383. The etymology of this name, which is unknown to me, might lead to the knowledge of the spot, where these stones are found. I have sought in vain the name of Macagua among the numerous tributary streams of the Tacutu, the Mahu, the Rupunury, and the Rio Trombetas.
Guahariboes, who traffic with hordes much farther to the east. The same circumstances take place respecting these stones, as with so many other valuable productions of the Indies. On the coast, at the distance of some hundred leagues, the country where they are found is positively named; but when the traveller with difficulty penetrates into this country, he discovers, that the natives are ignorant even of the name of the object of his research. It might be supposed, that the amulets of saussurite found in the possession of the Indians of the Rio Negro come from the Lower Maragnon, while those that are received by the missions of the Upper Oroonoko and the Rio Carony come from a country situate between the sources of the Essequibo and the Rio Branco. Yet, neither surgeon Hortsmann, a native of Hildesheim, nor don Antonio Santos, whose journal I examined, had seen the *amazon stone* in it's natural place; and the opinion that this stone is taken in a soft state like paste from the little lake Amucu, transformed into *Laguna del Dorado*, though very prevalent at Angostura, is wholly without foundation. A fine geographic discovery remains to be made in the eastern part of America, that of finding in a primitive soil a rock of euphotide containing the *piedra de Macagua*.

I shall here proceed to give some information respecting the tribes of dwarf and fair Indians,
which ancient traditions placed for centuries near the sources of the Oroonoko. I had an opportunity of seeing some of these Indians at Esmeralda, and can affirm, that the shortness of the Guaicas *, and the fairness of the Guahari-boes, whom Father Caulin † calls Guaribos blancos, have been alike exaggerated. The Guaicas, whom I measured, were in general from four feet seven inches to four feet eight inches high (ancient measure of France). We were assured, that the whole tribe were of this extreme littleness; but we must not forget, that what is called a tribe constitutes, properly speaking, but one family. The exclusion of all foreign mixture contributes to perpetuate varieties, or the aberrations from a common standard. The Indians of the lowest stature next to the Guaicas are the Guainares and the Poignaves. It is singular, that all these nations are found close to the Caribbees, who are remarkably tall. They all inhabit the same climate, and subsist on the same aliment. They are varieties in the race, which no doubt existed previously to the settle-

* It appears, that there are Guaicas also to the north-east of Esmeralda, near the Rio Cuyuni, in the missions of the Capuchins. Caulin, p. 57.

† He places them at the sources of the Canno Amaguaca. (Corogr., p. 81). They now wander more to the north-east, near the Great Cataract, above the Gehette and the Chiguire. Gili (vol. i, p. 334) calls them in Italian, Guaivi bianchi.
ment of these tribes, (tall and short, fair and dark brown) in the same country. The four nations of the Upper Oroonoko, that appeared to me to be the fairest, are the Guahariboes of the Rio Gehette, the Guainares of the Ocamo, the Guaicas of Canno Chiguire, and the Maquiritares of the sources of the Padamo, the Jao, and the Ventuari. It being very striking to see natives with a fair skin beneath a burning sky, and amid nations of a very dark hue, the Spaniards have forged two daring hypotheses, in order to explain this phenomenon. Some assert, that the Dutch of Surinam and the Rio Esquibo may have intermingled with the Guahariboes and the Guainares; others insist, from hatred to the Capuchins of the Carony, and the Observants of the Oroonoko, that the fair Indians are what are called in Dalmatia * muso di frate, children whose legitimacy is somewhat doubtful. In both cases the Indios blancos would be mestizoes, sons of an Indian woman and a white man. Now, having seen thousands of mestizoes, I can assert, that this comparison is altogether inaccurate. The individuals of the fair tribes, whom we examined, have the features, the stature, and the smooth, straight, black hair, which characterizes other Indians. It would be impossible to take them for a mixed race, like the

* At Cataro and Ragusa.
descendants of natives and Europeans. Some of these people are very little, others of the ordinary stature of the copper-coloured Indians. They are neither feeble, nor sickly, nor albinos; and they differ from the copper-coloured races only by a much less tawny skin. It would be useless after these considerations, to insist on the distance of the mountains of the Upper Oroonoko from the shore inhabited by the Dutch. I will not deny, that descendants of fugitive Negroes (negros alzados del palenque) may have been seen among the Caribbees, at the sources of the Esquibo; but no white man ever went from the eastern coast to the Rio Gehette and the Ocamo in the interior of Guyana. It must also be observed, although we may be struck with the singular union of fair tribes at one point to the east of Esmeralda, it is no less certain, that tribes have been found in other parts of America, distinguished from the neighbouring tribes by the colour of their skin being much less tawny. Such are the Arivirianoes and Maquiritaires of the Rio Ventuario and the Padamo, the Paudacotoes and Paravenas of the Erevato, the Viras and Ariguas of the Caura, the Mologagoes of Brazil, and the Guayanases of the Uruguay *.

* The Cumangotoes, the Maypures, the Mapojoes, and some hordes of the Tamanacs, are also fair, but in a less
The whole of these phenomena are so much the more worthy of attention, as they are displayed in that great branch of the American nations, that is generally opposed to the circum-polar branch, to that of the Tschougaz-Eski-degree than the tribes I have just named. We may add to this list (which the researches of Sommerring, Blumenbach, and Prichard, on the varieties of the human species, have rendered so interesting) the Ojes of the Cuchivero, the Boanes (now almost destroyed) of the interior of Brazil, and in the north of America, far from the north-west coast, the Mandans and the Akansas (Walkenaer Geogr., p. 645. Gili, vol. ii, p. 34. Vater, Amerikan. Sprachen, p. 81. Southey, vol. i, p. 603.) The most tawny, we might almost say the black-est of the American race, are the Otomacs and the Guamos. These have perhaps given rise to the confused notions of American Negroes, spread through Europe in the first ages of the conquest. (Herera, Dec. i, lib. 3, cap. 9, vol. i, p. 79. Garcia, Origen de los Americanos, p. 269.) Who are those Negroes de Quareca, placed by Gomara, p. 277, in that very isthmus of Panama, whence we received the first absurd tales of an American people of Albinoes? In reading with attention the authors of the beginning of the 16th century, we see, that the discovery of America, which was that of a new race of men, had singularly awakened the interest travellers took respecting the varieties of our species. Now, if a black race had been mingled with copper coloured men, as in the South-sea Islands, the conquistadores would not have failed to speak of it in a precise manner. Besides, the religious traditions of the Americans relate the appearance, in the heroic times, of white and bearded men as priests and legislators; but none of these traditions make mention of a black race.
moes*, whose children are fair, and who acquire the Mungal or yellowish tint only from the influence of the air and the dampness. In Guyana, the hordes that live in the midst of the thickest forests are generally less tawny than those, that inhabit the shores of the Oroonoko, and are employed in fishing. But this slight difference†, which is alike found in Europe between the artisans of towns and the cultivators of the fields or the fishermen on the coasts, no way explains the problem of the Indios blancos, the existence of those American tribes with the skin of Mestizoes. These are surrounded with other Indians of the woods (Indios del monte), who are of a reddish-brown, although now exposed to the same physical influences. The causes of these phenomena are very ancient, and

* See chap. 9, vol. iii, p. 290—298. The Chevalier Gieseke has recently confirmed all that Crantz had related of the colour of the skin of the Eskimoes. This race (even in the latitude of seventy-five and seventy-six degrees, where the climate is so rigorous) is not in general so diminutive as it was long believed to be. Ross, *Voyage to the North*, p. 127.

† Gomara (p. 278) has expressed himself on this point with that precision, which distinguishes his style, and his manner of painting objects. “Los Indios son leonados o membrillos cochos, o tiriciados o castaños por naturaleza y no por desnudez, como pensavan muchos, aunque algo les ayuda para ello ir desnudos.”
we may repeat with Tacitus; *est durans originis vis.*

These tribes with a fair complexion, which we had an opportunity of seeing at the mission of Esmeralda, inhabit part of a mountainous country, that extends between the sources of six tributary streams of the Oronoko, the Padamo, the Jao, the Ventuari, the Erevato, the Aruy, and the Paraguay * . The Spanish and Portuguese missionaries have the custom of designating this country more particularly by the name of Parima. Here, as in several other countries of Spanish America, the savages have reconquered what had been wrested from them by civilization, or rather by it's precursors, the missionaries. The expedition of the boundaries under Solano, and the extravagant zeal displayed by a governor of Guyana † for the discovery of Dorado, revived in the latter half of the eighteenth century, in some individuals, that spirit

* They are six tributary streams on the right bank of the Oronoko; the first three run toward the south, or the Upper Oronoko; the three others toward the north, or the Lower Oronoko. The word Parima, which signifies water, great water, is applied sometimes, and more especially, to the land bathed by the Rio Parima, or Rio Branco (Rio de Aguas Blancas), a stream running into the Rio Negro; sometimes to the mountains (Sierra Parima), which divide the Upper and Lower Oronoko.

† Don Manuel Centurion, Governador y Comendante general of Guyana from 1766 to 1777.
of enterprise, which characterized the Castilians at the period of the discovery of America. In going along the Rio Padamo, a road was observed across the forests and savannahs, ten days journey long, from Esmeralda to the sources of the Ventuari; and in two days more, from these sources, by the Erevato, the missions on the Rio Caura were reached. Two intelligent and daring men, don Antonio Santos, and Captain Barreto, had established, with the aid of the Maquiritares, a chain of military posts on this line from Esmeralda to the Rio Erevato. They were houses of two stories (casas fuertes), mounted with swivels, such as I have described above *, which figured as nineteen villages on the maps published at Madrid. The soldiers, left to themselves, exercised all kinds of vexations on the natives (Indians of peace), who had cultivated spots around the casas fuertes; and these vexations being less methodical, that is to say, worse contrived, than those to which the Indians are by degrees accustomed in the missions, several tribes formed a league, in 1776, against the Spaniards. All the military posts were attacked on the same night, on a line of nearly fifty leagues in length. The houses were burnt, and many soldiers massacred; a very small number only owing their preservation to the pity of the Indian women. This nocturnal

* Chap. 23, p. 404.
expedition is still mentioned with horror. Concerted in the deepest silence, it was executed with that concert, which the natives of both Americas, skilful in concealing their hostile passions, know how to practise in whatever concerns their common interests. Since 1776 no attempt has been made to reestablish the road, which leads by land from the Upper to the Lower Oroonoko, and no white man has been able to pass from Esmeralda to the Erevato. It is certain however, that in the mountainous lands, between the sources of the Padamo and the Ventuari (near the sites called by the Indians Aurichapa, Ichuana, and Irique,) there are many spots with a temperate climate, and with pasturages capable of feeding a great number of cattle*. The military posts have been

*The following are the most precise notions I could obtain on the spot, which differ much from those that father Caulin had acquired in Spain, long after his return from the Lower Oroonoko. The road to the Erevato passed between the mountains of Duida and Maraguaca, near the sources of the Rio Guapo. The military posts were Macha, Mauracare, Maracune, Matapi on the banks of the Padamo, Cointinamo on a tributary stream of the Rio Padamo, Mereico, el Orejon, Aurichapa, Irique, Ichuana de la Savana, Maveina, and Perique on the Upper Ventuario. As, from the extraordinary configuration of the land (see above, p. 451), a part of the Upper Oroonoko runs from east to west, in a direction parallel to the Lower Oroonoko, which flows from west to east, geographers, destitute of statements on the longitude of the confluent streams, several of which are in the same
very useful in preventing the incursions of the Caribbees, who, from time to time, carry off meridian, have committed great errors in the respective places they assign to these streams. According to astronomical observations, (those especially, which I made on the 22d of May, and the 12th of June), the village of Esmeralda, on the Upper Oroonoko, is one degree eighteen minutes west of the town of Muitaco, or Real Corona, on the Lower Oroonoko; according to the maps of La Cruz and Surville, Esmeralda is $0^\circ 25'$ east of Real Corona. The confluence of the Rio Arui with the Lower Oroonoko is, according to the Spanish maps, on the meridian that cuts the Upper Oroonoko at the point of bifurcation: according to my astronomical observations, and the maps published since my voyage to the Oroonoko, the meridian of the bifurcation (that of the origin of the Cassiquiare) crosses the Lower Oroonoko thirty-four leagues west of the mouth of the Arui, between the town of Alta Gracia and the confluence of the Cuchivero. Now, on connecting the mouth of the Rio Caura with the farm of Capuchino and Real Corona, two points, the situation of which I determined directly, we find it to be in the longitude of $67^\circ 42'$, or at most $67^\circ 45'$. A road traced from Padamo to the mouth of the Rio Caura would go to the north east, instead of going to the north west, as the maps of La Cruz and Surville indicate. This result is very important for ascertaining the situation of the sources of the Ventuari and the Erevato. As the geographers who have preceded me place the mouth of the Padamo forty minutes farther east of the bifurcation of the Oroonoko than it really is, they find this mouth not $0^\circ 26'$ to the west, as in my Atlas of South America, but $2^\circ 10'$ east of the confluence of the Caura. We are indeed ignorant of the difference of longitude between the mouth of the Rio Caura and that point of the Erevato (a tributary stream of the Caura), at which the ancient road from Esmeralda terminated; but it is difficult
slaves, though in very small numbers, between the Erevato and the Padamo. They would have resisted the attacks of the natives, if, instead of leaving them isolated, and solely dependant on the soldiers, they had been formed into communities, and governed like the villages of neophyte Indians.

We left the mission of Esmeralda on the 23d of May. Without being ill, we felt ourselves in a state of languor and weakness, caused by the torment of insects, bad nourishment, and a long voyage, in narrow and damp boats. We had not gone up the Oroonoko beyond the mouth of the Rio Guapo, which we should have done, if we could have attempted to reach the sources of the river. In the present state of things, private individuals, who are permitted to enter the missions, should confine their journey to the pacific part of the country. There remain fifteen leagues from the Guapo to the Raudal of the Guahari-boes. At this cataract, which is passed on a bridge of lianas, Indians are posted armed with bows and arrows, who prevent the whites, or to believe, that the Upper Erevato is found in nature carried so far back toward the west, that the direction of the road from Padamo to the Erevato should be north west. What is more certain, and very remarkable, on account of the position of the mouth of the Ventuari (1° 36' west of Esmeralda), is, that we find the sources of the Ventuari, or rather the upper part of it's course, in the direction of the road from the Padamo to the Erevato.
those who come from the territory of the whites, from advancing toward the west. How could we hope to pass a point, where the commander of the Rio Negro, don Francisco Bovadilla was stopped, when, accompanied by his soldiers, he tried to penetrate beyond the Gehette? The carnage then made among the natives has rendered them more distrustful, and more averse to the inhabitants of the missions. It must be remembered, that the Oroonoko had hitherto offered to geographers two distinct problems, alike important, the situation of its sources, and the mode of its communication with the Amazon. The latter of these problems formed the object of the journey, which I have described: with respect to the discovery of the sources, this remains to be completed by the Spanish and Portugueze governments. A small detachment of soldiers, proceeding from Angostura or the Rio Negro, would be sufficient to resist the Guahariboes, the Guayras, and the Caribbees, whose force and numbers are alike exaggerated in the missions. This expedition might proceed either from Esmeralda toward the east, or by the Rio Caroni and the Paragua toward the south-west, or lastly, by the Rio Padaviri, or the Rio Branco and the Urariquera, toward the north-west. As the Oroonoko is probably not known near its origin by this name, or by that of Paragua*, the

* This is the Indian name of the Upper Oroonoko. (See
surest course would be, to go beyond the Gehette, after having crossed the country between Esmeralda and the Raudal of the Guahariboes, of which I have given above a particular description. By this means the principal trunk of the river would not be confounded with an upper tributary stream, and the traveller would continue to go up the Oroonoko, along one bank or the other, where the bed was obstructed by rocks. If however, instead of going toward the east, he would seek the sources directing his course toward the west, by the Rio Carony, the Essequibo, or the Rio Branco, the object of the expedition could not be considered as attained, unless he descended that river, which he supposed to be identified with the Oroonoko, as far as the mouth of the Gehette and the mission of Esmeralda. The Portugueze fort of San Joaquim, on the left bank of the Rio Branco, near the confluence of the Tacutu, would be another point of departure favourably situate; and which above, p. 219.) As the words Paragua and Parima signify water, great water, sea, lake, we must not be surprised, if streams entirely independant of each other bear these names. The Spaniards give the name of Paragua to that tributary stream of the Rio Carony, which receives the Paruspa, by which the Caribbees proceeded formerly into the valley of Caura. The Portugueze give the name of the Rio Parima sometimes to the whole of the Rio Branco (Rio de Aguas blancas) itself, sometimes to a small tributary stream of this river.
I recommend, because I am ignorant whether the mission of Santa Rosa, established more to the west on the banks of the Urariapara, under the government of don Manuel Centurion, at the time of the foundation of the Ciudad de Guirior, still exists*. The surest manner of arriving at the sources of the Oroonoko would be by following the course of the Paragua to the west from the destacamento, or military post, of Guirior, situate in the missions of the Catalan Capuchins, or proceeding toward the west, from the Portugueze fort of San Joaquim, in the valley of the Rio Uruariquera. The observations of the longitude, which I made at Esmeralda, may facilitate this research, as I have shown in

* The name of Santa Rosa is found on the most recent maps of the dépôt at Rio Janeiro, which are very minute on the northern part of the Rio Branco. The Urariapara falls into the Rio Uruariquera (the Curaricara of Surville's map), which receives the little Rio Parima, and which, with the Tacutu, forms, near the fort of San Joaquim, the Rio Branco. As the Uruariquera flows from east to west, it is in going up this river that you approach nearest to Esmeralda and the source of the Oroonoko. On the north of the Uruariquera, the Cordillera of Pacaraimo, which was crossed by Don Antonio Santos, also stretches itself in the direction of the latitude. It forms the point of division between the waters of the Rio Branco, and those of the Essequibo and the Carony, (See above, p. 480.) An assemblage of huts, pompously called Ciudad de Guirior, stands on the Rio Paragua (a tributary steam of the Carony), where it receives the Paraguamusi.

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a memoir addressed to the Spanish ministry during the reign of Charles the Fourth.

If in the great and useful establishment of the American missions those improvements were gradually made, which have been demanded by several bishops; if, instead of recruiting missionaries at hazard in the Spanish convents, young ecclesiastics were prepared for these functions in seminaries or colleges of missions founded in America; the military expeditions, which I propose, would become useless. The habit of Saint Francis, whether brown, like that of the Capuchins of Carony, or blue, like the habit of the Observantins of the Oroonoko, has still a certain charm for the Indians of those countries. They annex to this habit I know not what ideas of prosperity and comfort, the hope of acquiring hatchets, knives, and implements for fishing. Even those, who, proud of their independance and their separate state, refuse to suffer themselves to be "governed by the sound of the bell," receive with pleasure the visit of a neighbouring missionary. What has driven the natives from the banks of the river was the exactions of the soldiers, and the hostile incursions of the monks; the entradas and conquistas apostolicas. By renouncing the unreasonable system of introducing the customs of convents into the forests and savannahs of America, by leaving the Indians to enjoy the fruits of their labours, and by govern-
ing them less, that is by not shackling every instant their natural liberty, the missionaries would see the sphere of their activity, which ought to be that of civilization, rapidly increase. Monastic establishments have diffused in the equinoxial part of the New World, as in the north of Europe, the first germes of social life. They still form a vast zone around the European possessions; and, whatever abuses may have crept into institutions, where all power is confounded in one, they would be with difficulty replaced by others, which, without producing more serious inconveniences, would be as little chargeable, and as well adapted to the silent phlegm of the natives. I shall recur again to these settlements, the political importance of which is not sufficiently understood in Europe. It will be sufficient here to observe, that expeditions of discovery accompanied by an armed force would be useless, were the government and the bishops to employ themselves seriously in the melioration of the missions. The Christian settlements the most distant from the coast are at present the most neglected. The poor monks are left in absolute want. Occupied in acquiring subsistence, making unceasing efforts to be placed in some mission less remote from civilization, that is from white and rational people*, they are little tempted to go forward.

* See above, p. 269.
Their progress would become rapid, if (after the example of the Jesuits) extraordinary succours were assigned to the most distant missions; and if the most courageous and intelligent ecclesiastics, and those best versed in the Indian languages, were placed in the most advanced posts, at Guirior, San Luis del Erevato, and Esmeralda *. The little that remains to be discovered of the Oroonoko (probably a space of twenty-five or thirty leagues) would then be soon explored; for in both Americas the missionaries arrive every where first, because they find facilities, which are wanting to every other traveller. "You boast of your journeys beyond Lake Superior," said an Indian of Canada to some fur traders of the United States; "you forget then, that the black coats passed it long before you; and that it was they who showed you the way to the west."

Our canoe was not ready to receive us till near three o'clock in the afternoon. It had been filled with an innumerable quantity of ants during the navigation of the Cassiquiare; and the toldo, or roof of palm-leaves, beneath which we had again to remain stretched out during twenty-two days, was freed with difficulty from these

* These three points are on the confines of the missions of the Rio Carony, the Rio Caura, and the Upper Oroonoko.
insects. We employed part of the morning in repeating to the inhabitants of Esmeralda the questions, which we had already put to them on the existence of a lake toward the east. We showed copies of the maps of Surville and La Cruz to old soldiers, who had been posted in the mission ever since it's first establishment. They laughed at the pretended communication of the Oroonoko with the Rio Idapa, and at the White Sea, which the former river was supposed to cross. What we politely call geographical fictions, appeared to them lies of the other world (mentiras de por allá). These good people could not comprehend, how men, in making the map of a country, which they had never visited, could pretend to know things in minute detail, of which persons who lived on the spot were ignorant. The lake Parima, the Sierra Mey, the springs that separate at the point where they issue from the earth, were entirely unknown at Esmeralda. We were repeatedly assured, that no one had ever been to the east of the Raudal of the Guahariboes; and that beyond this point, according to the opinion of some of the natives, the Oroonoko descends like a small torrent from a group of mountains, inhabited by the Coroto Indians. I urge these circumstances, because, if at the time of the royal expedition of the boundaries, or after that memorable occasion, any white man had actually reached the sources of
the Oroonoko, and the pretended lake Parima, the tradition would have been preserved in the nearest mission, which must have been passed in order to make so important a discovery. Now the three persons, who had knowledge of the labours of the expedition of the boundaries, Father Caulin, La Cruz, and Surville, have published notions on the origin of the Oroonoko that are diametrically opposite to each other. How could these contradictions have existed, if, instead of having founded their maps on calculations and hypotheses framed at Madrid, those learned men had had before their eyes the narrative of one real journey. Father Gili, who had inhabited the banks of the Oroonoko during eighteen years*, when the expedition of the boundaries arrived, says expressly: "that don Apollinario Diez was sent in 1765, to attempt the discovery of the source of the Oroonoko; that he found the river, east of Esmeralda, full of shoals; that he returned for want of provision; and that he learned nothing, absolutely nothing, of the existence of a lake." This assertion is in perfect conformity with what I heard myself thirty-five years later at Esmeralda, where the name of don Apollinario is still in the mouths of all the inhabitants, and whence journeys are making continually beyond the con-

* From 1749 to 1767, Gili, vol. i, p. 19 and 324.
fluence of the Gehette. The probability of a fact is powerfully shaken, when it can be proved to be totally unknown on the very spot, where it ought to be known best; and when those, by whom it is related, contradict each other, not in the least essential circumstances, but in all that are the most important. I will enlarge no longer on a discussion merely geographical; I shall here show, how the errors of the modern maps have arisen from the habit of constructing them upon the ancient maps; how portages have been taken for branchings of rivers; how rivers, called by the Indians great waters, have been transformed into lakes; how two of these lakes (Cassipa and Parima), have been confounded and misplaced since the sixteenth century; finally, how we find in the names of the tributary streams of the Rio Branco the key of the greater part of these superannuated fictions.

We were surrounded, when we embarked, by those inhabitants, who call themselves whites and of Spanish race. These poor people conjured us, to solicit from the governor of Angostura their return to the steppes (Llanos), or, if this favour were refused, their removal to the missions of the Rio Negro, as to a cooler climate, more free from insects. "However great may have been our faults," said they, "we have expiated them by twenty years of torments amid this swarm of moustiques." I pleaded the cause
of these proscribed men in a report made to the government on the state of industry and commerce in those countries. My efforts were fruitless; the government at the period of my voyage was indeed moderate, and generally inclined to mild measures; but they, who are acquainted with the complicated machinery of the ancient Spanish monarchy, know how little the spirit of the ministry concerned itself in the well-being of the inhabitants of the Oronoko, New California, and the Philippine Islands.

When travellers attend only to the sensations they feel, they dispute with each other on the abundance of the moschettos, as on the progressive increase or diminution of the temperature. The state of our organs, the motion of the air, its degree of humidity or dryness, its electric intensity, a thousand circumstances contribute at once, to make us suffer more or less from the heat and the insects. My fellow travellers thought unanimously, that Esmeralda was more tormented by moschettos than the banks of the Cassiquiare, and even than the two missions of the Great Cataracts: as I was less sensible than they of the high temperature of the air, it appeared to me, that the irritation produced by the insects was somewhat less at Esmeralda, than at the entrance of the Upper Oronoko. We made use of cooling lotions; the juice of limes, and still more that of the
pine-apple, perceptibly moderated the itching of old stings: without diminishing the swellings, they rendered them less painful. When you hear the complaints, that are made of these tormenting insects in hot countries, it is difficult to believe, that their absence, or rather their sudden disappearance, could become a subject of inquietude. The inhabitants of Esmeralda related to us, that in the year 1795, an hour before sunset, when the moschettoes form a very thick cloud, the air was suddenly free from them during twenty minutes. Not one insect was perceived, although the sky was without clouds, and no wind announced rain. It is necessary to have lived in those countries, to comprehend the degree of surprise, which the sudden disappearance of the insects must have produced. The inhabitants congratulated each other, and inquired, whether this state of happiness, this relief from pain (felicidad y alivio), could be of any duration. But soon, instead of enjoying the present, they yielded to chimerical fears, and imagined, that the order of nature was perverted. Some old Indians, the sages of the place, asserted, that the disappearance of the insects must be the precursor of a great earthquake. Warm disputes arose; the least noise amid the foliage of the trees was listened to with an attentive ear; and when the air was again filled with moschettoes, they were almost hailed with plea-
sure. We could not guess what modification of the atmosphere had caused this phenomenon, which must not be confounded with the periodical replacing of one species of insects by another. The animated recital of the natives, however, fixed our attention: we fancied we saw man distrustful, uncertain with what he is menaced, regretting his accustomed sufferings.

The weather, when we left Esmeralda, was very stormy. The summit of Duida was enveloped in clouds, but this mass of vapours, so black, and so strongly condensed, still supported itself at the height of nine hundred toises above the surrounding plains. In judging of the mean elevation of the clouds, that is of their lower stratum in different zones, we must not confound the sporadic or solitary group with that sheet of vapours, which, extending in a continued body above the plains, terminates at a chain of mountains. It is these sheets of vapours only, which can be considered as giving any certain results; solitary groups of clouds are often ingulfed in the vallies by the sole effect of descending currents. We saw clouds near the town of Caraccas* at five hundred toises above

* Below the Cross of la Guayra. (See vol. iii, p. 581; and Obs. Astr., vol. i, p. 296.) I have entered into these particulars on the height of clouds, to show how much it is to be desired, that this height had been oftener determined by aerostatic voyages. When the balloon ascends in the midst
the level of the sea; yet we cannot easily admit, that the clouds above the coast of Cumana and the island of Margaretta sustain themselves at so small a height. The storm which growled around the top of Duida did not descend into the valley of the Oroonoko; we did not in general observe in that valley those strong electric explosions, which almost every night, during the rainy season, alarm the traveller along the Rio Magdalena, in going up from Carthagena to Honda. It would seem as if the storms in a flat country followed the furrow or bed of a large river more regularly than in a country unequally studded with mountains, and exhibiting various branchings of lateral valleys. We repeatedly examined the temperature of the water of the Oroonoko at its surface, while the ther-

of a plain, you are sure of obtaining results, that are independent of the local effect which has just been mentioned. Gay-Lussac and Biot, in their aerostatic ascents, found the inferior limit of the clouds above Paris at six hundred toises, in the great heats of summer. The fogs, in which you are so frequently enveloped at Xalapa, on the eastern declivity of the Cordillera of Mexico, led me to admit formerly, that the mean height of the clouds above Vera Cruz was only seven hundred toises; but the proximity of woody and damp mountains, the radiation from the soil and leaves during the night in a serene sky, and the electric conductibility of the rock, render those conclusions somewhat uncertain, that are drawn from the measure of the height of clouds adhering to mountains.
mometer in the air kept up at $30.3^\circ$; it was only $26^\circ$ centesimal, consequently $3^\circ$ lower than at the Great Cataracts, and $2^\circ$ higher than the waters of the Rio Negro. In the temperate zone in Europe, the Danube and the Elbe* attain in the middle of summer only from $17^\circ$ to $19^\circ$. I could never find a difference at the Oroonoko between the diurnal and nocturnal heat of the waters, except when I plunged the thermometer into shallow parts of the river, where it flows with extreme slowness over a wide, sandy beach, as at Uruana, and toward the mouth of the Apure. Although in the forests of Guyana, the radiation from the soil is much slackened beneath a sky constantly cloudy, the temperature of the air diminishes sensibly during the night. The upper stratum of water is then hotter than the surrounding soil; and if the mingling of two portions of air almost satu-

* The following are the differences founded on direct experiments made before my departure from Europe, during a long residence at Vienna and Dresden.

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<tr>
<th>Latitude 48—49°</th>
<th>Latitude 5—8°</th>
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<td>Temperature of the rivers in summer, 17—19° cent.</td>
<td>26—29°. (The Oroonoko.)</td>
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<tr>
<td>Temperature of the air in the hottest month, 18—19.5°.</td>
<td>23—29°.</td>
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<tr>
<td>Mean temperature of the year, 10—12°.</td>
<td>27—28°.</td>
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rated* with moisture, resting on the forest and on the bed of the river, produce no perceptible mist, it is difficult to attribute this circumstance to the little coolness of the night†. During my abode on the banks of the Oroonoko and the Rio Negro, the water of these rivers was often from two to three degrees hotter than the nocturnal temperature of the air unagitated by the wind.

After four hours navigation in going down the Oroonoko, we arrived at the point of the bifurcation. Our resting place was on the same beach of the Cassiquiare, where a few days before our great dog had probably been carried off by the jaguars. All the researches made by the Indians to discover some traces of this animal were fruitless. The sky remaining cloudy, I waited in vain for the stars, but I repeated the observation of the magnetic dip, which I had

* See vol. ii, p. 92; and p. 85 of the present volume.
† See the interesting papers of Sir Humphrey Davy on the formation of fogs. (Phil. Trans., 1819, P. I, p. 211.) At the Great Cataracts the air at night was between twenty-seven and twenty-nine degrees, and the water of the Oroonoko at 27°6'; but on the banks of the Rio Negro, I have seen the cent. thermometer sink at night, in the air, to 22°, and the surface of the river keep at 24°. (See above, p. 165 and 344.) Thus at the Lower Oroonoko, east of the mouth of the Apure, where the breeze blows freely, the water of the river is generally at 28° while the nocturnal temperature of the air sinks to 25° or lower.
made at Esmeralda. I had found it at the foot of Duida 28°25' div. cent., almost 3° more than at Mandavaca. I obtained at the mouth of the Cassiquiare 28°75'; the influence of Duida therefore appeared to be imperceptible. The cries of the jaguars * were heard during the whole night. They are extremely frequent in those countries, between the Cerro Maraguaca, the Unturan, and the banks of the Pamoni. There also is found that black tiger †; of which I saw some fine skins at Esmeralda. This animal is celebrated for it's strength and ferocity; it appears to be still larger than the common jaguar. The black spots are scarcely visible on the dark-brown ground of it's skin. The Indians assert, that these tigers are very rare, never mingle with

* This frequency of large jaguars is somewhat remarkable in a country destitute of cattle. The tigers of the Upper Oroonoko lead a wretched life in comparison of those of the Pampas of Buenos Ayres and the Llanos of Caraccas, covered with herds of cattle. More than four thousand jaguars are killed annually in the Spanish colonies, several of them equaling the mean size of the royal tiger of Asia. Two thousand skins of jaguars were formerly exported annually from Buenos Ayres alone; they are called by the furriers of Europe skins of the great panther.

† Gmelin in his Synonima, seems to confound this animal by the name of felis discolor with the great American lion, felis concolor, which is very different from the little lion (puma) of the Andes of Quito. (Lin. Syst. Nat. vol. i, p. 79. Cuvier, Regne animal, vol. i, p. 160.)
the common jaguars, and "form another race." I believe, that Prince Maximilian of Neuwied, who has enriched American zoology by so many important observations, acquired the same notions farther to the south, in the hot part of Brazil. Albino varieties of the jaguar have been seen in Paraguay: for the spots of these animals, which might be called the beautiful panthers of America, are sometimes so pale, as to be scarcely distinguishable on a very white ground. In the black jaguars, on the contrary, it is the colour of the ground that makes the spots disappear. It requires to have lived long in those countries, and to have accompanied the Indians of Esmeralda in the perilous chase of the tiger, to pronounce with certainty upon the varieties and the species. In all the mammiferæ, and particularly in the numerous family of the apes, we ought, I believe, to fix our attention less on the passage from one colour to another in the individuals, than on their habit of separating themselves, and forming distinct bands.

May the 24th. We left our resting place before sunrise. In a rocky cove, which had been the dwelling of some Durimundi Indians, the aromatic odour of the plants was so powerful, that, although sleeping in the open air, and having our nervous system rendered little irritable, in consequence of the habits of a life exposed to fatigues, we were incommoded by it.
We could not discover what the flowers were, that diffused this perfume. The forest was impenetrable: M. Bonpland believed, that large clumps of pancratium and other liliaceous plants were concealed in the neighbouring marshes. Descending the Oroonoko by the favour of the current, we passed first the mouth of the Rio Cunucunumo, and then the Guanami and the Puruname. The two banks of the principal river are entirely desert; lofty mountains rise toward the north, and on the south a vast plain extends far as the eye can reach beyond the sources of the Atacavi, which lower down takes the name of the Atabapo. There is something melancholy and painful in this aspect of a river, on which not even a fisherman's canoe is seen. Some independant tribes, the Abirianoes and the Maquiritaras, dwell in the mountainous country; but in the neighbouring savannahs*, bounded by the Cassiquiare, the Atabapo, the Oroonoko, and the Rio Negro, there is now scarcely any trace of a human habitation. I say now; for here, as in other parts of Guayana, rude figures† representing the Sun, the Moon,

* They form a quadrilateral plot of a thousand square leagues, the opposite sides of which have contrary slopes, the Cassiquiare flowing toward the south, the Atabapo toward the north, the Oroonoko toward the north-west, and the Rio Negro toward the south-east.

† Compare vol. iv, p. 473; and p. 382 of the present volume.
and different animals, are traced on the hardest rocks of granite, and attest the anterior existence of a people, very different from those who became known to us on the banks of the Oroonoko. According to the accounts of the natives, and of the most intelligent missionaries, these symbolic signs resemble perfectly the characters we saw a hundred leagues more to the north, near Caycara, opposite the mouth of the Rio Apure.

We are the more struck with the remains of an ancient civilization, in proportion as they fill a wider space, and form a stronger contrast with the barbarism, in which since the conquest we find the hordes of the hot and oriental regions of South America. In advancing from the plains of the Cassiquiare and the Conorichite, one hundred and forty leagues toward the east, between the sources of the Rio Branco and the Rio Essequibo, we also meet with rocks with symbolical figures. I have lately verified this fact, which appears to me extremely curious, in the journal of the traveller Hortsmann, a copy of which I have before me in the hand-writing of the celebrated d'Anville. That traveller, whom I have several times had occasion to mention in this work, went up the Rupunuvini*, one of the

* This word no doubt signifies water (veni, oueni) of Rupununi, or Rupunuri. (See above, p. 480). Veni is a word of
tributary streams of the Essequibo. Where this river, full of small cascades, winds between the mountains of Macarana, he found *, before he reached lake Amucu, "rocks covered with figures, or (as he says in Portugueze) with varias letras." We do not take this word letters in its real signification. We were also shewn near the rock Culimacari, on the banks of the Cassiquiare, and at the port of Caycara in the Lower Oroonoko, traces, which were believed to be regular characters. They were however only mishapen figures, representing the heavenly bodies, and tigers, crocodiles, boas, and instruments used for the fabrication of the flour of cassava. It was impossible to recognize in these painted rocks† (the name by which the the great branch of the Maypure, Cabre, Guaipunave, Avane, and Pareni tongues.

* April the 18th, 1740. Nicholas Hortsmann noted daily on the spot every thing, that appeared to him worthy of observation. He deserves confidence the more, as, being disappointed by the failure of the object of his researches (the lake Dorado, and the mines of gold and diamonds), he seems to regard with disdain every thing he met on his way.

† In Tamanac, tepumereme. (Tepe, a stone, rock; as in Mexican, teel, a stone, and tepetl, a mountain; in Turcotatarian, tepe.) The Spanish Americans also call the rocks covered with sculptured figures piedras pintadas; those for instance, which are found on the summit of the Paramo of Guanaeas, in New Grenada, and which recall to mind the tepumereme of the Oroonoko, the Cassiquiare, and the Rupunuvini.
natives denote those masses loaded with figures) any symmetrical arrangement, or characters with regular spaces. The traces discovered in the mountains of Uruana, by the missionary Fray Ramon Bueno, approach nearer to alphabetical writing; these very characters, however, which I have elsewhere discussed, still have many doubts*.

Whatever may be the meaning of these figures, and with whatever view they were traced upon granite, they do not less merit the attention of those, who occupy themselves with the philosophic history of our species. In travelling from the coast of Caraccas toward the equator, we are at first led to believe, that monuments of this kind are peculiar to the chain of mountains of Encaramada; they are found at the port of Sedeno, near Caycara†, at San Rafael del Capuchino, opposite Cabruta, and in almost every place where the granitic rock pierces the soil in the savannah, which extends from the Cerro Curiquima toward the banks of the Caura. The nations of the Tamanac race, the ancient inhabitants of those countries, have a local mythology, and traditions which relate to these sculptured rocks. Amalivaca, the father of the Tamanacs, that is the creator of the human race

* See vol. iv, p. 499; and my Views of the Cordilleras and Monuments of the Ancient Inhabitants of America, vol. i (or xiii of the present work), p. 153.
† In the mountains of the tyrant, Cerros del tyrano.
(for every nation regards itself as the root of the other nations), arrived in a bark, at the time of the great inundation, which is called the *age of water*, when the billows of the ocean broke against the mountains of Encamarada in the interior of the land. All mankind, or, to express myself better, all the Tamanacs, were drowned, with the exception of one man and one woman, who saved themselves on a mountain near the banks of the Asiveru, called Cuchivero by the Spaniards†. This mountain is the Ararat of the Aramean or Semitic nations, and the Tlaloc or Colhuacan of the Mexicans. *Amalivaca*, sailing in his bark, engraved the figures of the Moon and the Sun on the *Painted rock* (*Tepumereme*) of Encaramada. Some blocks of granite piled upon one another, and forming a kind of cavern, are still called the *house or dwelling* of the great forefather of the Tamanacs‡. The natives show also a large stone near this cavern, in the plains of Maita, which they say was an instrument of music, the *drum of Amulivaca*§. We must here observe,
that this heroic personage had a brother, Vochi, who helped him to give the surface of the Earth its present form. The Tamanacs relate, that the two brothers, in their system of perfectibility, sought at first, to arrange the Oroonoko in such a manner, that the current of the water could always be followed either going down or going up the river. They hoped by this means to spare men the trouble of rowing in proceeding toward the source of rivers; but, however great the power of these regenerators of the world, they could never contrive to give a double slope to the Oroonoko, and were compelled to relinquish this singular hydraulic system. Amalivaca had daughters, who had a decided taste for travelling. The tradition says, no doubt in a figurative style, that he broke their legs, to render them sedentary, and force them to people the land of the Tamanacs. After having regulated every thing in America, on that side of the great water, Amalivaca again embarked, and "returned to the other shore," to the same place from which he came. Since the natives have seen the missionaries arrive, they imagine, that Europe is this other shore; and one of them inquired with great simplicity of father Gili, whether he had seen the great Amalivaca yonder, the father of the Tamanacs, who had covered the rocks with symbolic figures.

These notions of a great cataclysm; of a cou-
people saved on the summit of a mountain, and throwing behind them the fruits of the mauritia palm-tree, to repeople the Earth*; of that national divinity, Amalivaca, who arrived by water from a distant land, prescribed laws to nature, and forced the nations to renounce their migrations; these various features of a very ancient system of belief, are well worthy to fix our attention. What the Tamanacs, and the tribes whose languages are analogous to the Tamanac tongue, now relate to us, they have no doubt learned from other people, who inhabited before them the same regions†. The name of Amalivaca is spread over a region of more than five thousand square leagues; it is found designating the father of mankind (our great grandfather) as far as to the Caribbee nations‡, whose idiom approaches that of the Tamanac only in the same degree as the German approaches the Greek, the Persian, and the Sanscrit. Amalivaca is not originally the Great Spirit, the Aged of Heaven, that invisible being, whose worship springs from that of the powers of nature, when nations rise insensibly to the sentiment of the unity of these powers; he is

* See vol. iv, p. 472.
† The Parecas, Avarigotoes, Quiriquiripas, and Mariquitares.
‡ The Caribbees say Amarivaca, as they call themselves Carina and Calina (Galibis) by changing the r into l.
rather a personage of the heroic times, a man, who, coming from afar, lived in the land of the Tamanacs and the Caribbees, sculptured symbolical figures upon the rocks, and disappeared by going back to the country he had previously inhabited beyond the Ocean. The anthropomorphitism of the divinity has two sources* diametrically opposite; and this opposition seems to arise less from the various degrees of intellectual culture, than from the different dispositions of nations, some of which are more inclined to mysticism, and others more governed by the senses, and by external impressions. Sometimes man makes the divinities descend upon Earth, charging them with the care of ruling nations, and giving them laws, as in the fables of the East; sometimes, as among the Greeks and other nations of the West, they are the first monarchs, priest-kings, who are stripped of what is human in their nature to be raised to the rank of national divinities. Ama-
livaca was a stranger, like Manco-Capac, Bo-
chica, and Quetzalcohuatl; those extraordinary men, who, in the alpine or civilized part of Ame-
rica, on the table lands of Peru, New Grenada, and Anahuac, organized civil society, regulated the order of sacrifices, and founded religious congregations. The Mexican Quetzalcohuatl,

* Creuzer, Symbolik der alten Völker, vol. iii, p. 89.
whose descendants Montezuma* thought he recognized in the companions of Cortez, displays an additional resemblance to Amalivaca, the mythologic personage of savage America, or the plains of the torrid zone. When advanced in age, the high-priest of Tula left the country of Anahuac, which he had filled with his miracles, to return to an unknown region, called Tlalpallan. When the monk Bernard de Sahagun arrived in Mexico, the same questions precisely were put to him, as those which were addressed to father Gili two hundred years later in the forests of the Oroonoko; he was asked, whether he came from the other shore, from the countries to which Quetzalcohuatl had retired†.

We have seen above, that the region of sculptured rocks, or of painted stones, extends far beyond the Lower Oroonoko, beyond the country (latitude 7° 5' to 7° 40'; longitude 68° 50' to 69° 45') to which belongs what may be called the local fable of the Tamanacs. We again find these same sculptured rocks between the Cassiquiare and the Atabapo (lat. 2° 5' to 3° 20'; long. 69° to 70°); and between the sources‡ of the Essequibo and the Rio Branco.

* The second king of this name, of the race of Acamapitizin, properly called Montezuma-Ilhuicamina.
† Torquemada, vol. ii, p. 53.
‡ The situation indicated as long. 62° 32' is properly that
(lat. 3° 50′; long. 62° 32′). I do not assert, that these figures prove the knowledge of the use of iron, or that they denote a very advanced degree of culture; but even on the supposition, that, instead of being symbolical, they are the fruits of the idleness of hunting nations, we must still admit an anterior race of men, very different from those who now inhabit the banks of the Oroonoko and the Rupunuri. The more a country is destitute of remembrances of generations that are extinct, the more important it becomes to follow the least traces of what appears to be monumental. The eastern plains of North America display only those extraordinary circumvallations, that remind us of the fortified camps (the pretended cities of an immense extent) of the ancient and modern nomade tribes of Asia. In the oriental plains of South America, the force of vegetation, the heat of the climate, and the too lavish gifts of nature, have opposed obstacles still more powerful to the progress of human civilization. Between the Oroonoko and the Amazon I heard no mention of one wall of earth, one vestige of a dike, one sepulchral of the confluence of the Pirara with the Rio Mahu, one of the upper branches of the Rio Branco. I found this situation on the difference of longitude which M. de la Condamine has given between the Para and the fort of Rio Negro, determining the mouth of the Rio Branco (long. 64° 38′) from the longitude of the fort.
tumulus; the rocks alone show us, and this through a great extent of country, rude sketches, which the hand of man has traced in times unknown, and which are connected with religious traditions. When both Americas shall be peopled by men, who regard with less disdain the soil that feeds them, the relics of former ages will be more numerous in our eyes from day to day. A feeble light will spread over the history of the barbarous nations, over these steep rocks, which tell us, that the regions now desert were heretofore inhabited by a race of more intelligent and active men.

Before I quitted the most savage part of the Upper Oroonoko, I thought it was proper to mention facts, which are important only when they are considered in their connection with each other. All I could relate of our navigation from Esmeralda to the mouth of the Atabapo would be merely a dry enumeration of rivers and uninhabited places. From the 24th to the 27th of May, we slept but twice on the land; our first resting place was at the confluence of the Rio Jao, and our second below the mission of Santa Barbara, in the island of Minisi. The Oroonoko being free from shoals, the Indian pilot made us navigate all night, abandoning the boat to the current of the river. This part of my map, between the Jao and the Ventuari, has consequently little accuracy in what regards the wind-
ings of the Oroonoko. Setting apart the time which we spent on the shore in preparing the rice and plaintains that served us for food, we took but thirty-five hours in going from Esmeralda to Santa Barbara. The chronometer gave me for the longitude of the latter mission 70° 3'; we had therefore made near four miles an hour, a velocity (of 1'05 toise in a second) which was partly owing to the current, and partly to the action of the oars. The Indians assert, that the crocodiles do not go up the Oroonoko above the mouth of the Rio Jao, and that the manatees are not even found above the cataract of Maypures. It is easy to be deceived respecting the first of these two animals; the traveller most habituated to see them may mistake a trunk of a tree twelve or fifteen feet long for a crocodile swimming with part of the head and tail only above the water.

The mission of Santa Barbara is situated a little to the west of the mouth of the Rio Ventuari, or Venituari, which was examined in 1800 by Father Francisco Valor. We found in this small village of one hundred and twenty inhabitants some traces of industry: but the produce of this industry is of little profit to the natives; it is reserved for the monks, or as they say in those countries, for the church and the convent. We were assured, that a great lamp of massive silver, purchased at the expense of the neophytes,
is expected from Madrid. Let us hope, that, after the arrival of this lamp, they will think also of clothing the Indians, of procuring for them some instruments of agriculture, and of assembling their children in a school. Although there are a few oxen in the savannahs round the mission, they are rarely employed in turning the mill (trapiche), to express the juice of the sugar-cane; this is the occupation of the Indians, who work without pay, as they do everywhere when they are understood to work for the church. The pasturages at the foot of the mountains that surround Santa Barbara are not so rich as at Esmeralda, but superior to those at San Fernando de Atabapo. The grass is short and thick, yet the upper stratum of earth furnishes only a dry and parched granitic sand. The savannahs, far from fertile, of the banks of the Guaviare, the Meta, and the Upper Oroonoko, are equally destitute of that mould, which abounds in the surrounding forests, and of the thick stratum of clay, that covers the sandstone of the Llanos, or steppes, of Venezuela. The small herbaceous mimosas contribute in this zone to fatten the cattle, but are very rare between the Rio Jao and the mouth of the Guaviare.

During the few hours of our stay at the mission of Santa Barbara, we obtained pretty accurate ideas respecting the Rio Ventuari, which,
next to the Guaviare, appeared to me to be the most considerable tributary stream of the Oroonoko. It's banks, heretofore occupied by the Maypures, are still peopled by a great number of independant nations. On going up by the mouth of the Ventuari, which forms a delta covered with palm-trees *, you find on the east, after three days journey, the Cumaruita and the Paru, two streams that rise at the foot of the lofty mountains of Cuneva. Higher up, on the west, lie the Mariata and the Manipiare †, inhabited by the Macoes and Curacicanas. The latter nation is remarkable for the ardour with which it cultivates cotton. In a hostile incursion (entrada) a large house was found containing more than thirty or forty hammocks of a very fine texture of spun cotton, cordage, and fishing implements. The natives had fled; and Father Valor informed us, "that the Indians of the mission, who accompanied him, had set fire to the house, before he could save these productions of the industry of the Curacicanas." The neophytes of Santa Barbara, who think themselves very superior to these pretended savages, appeared to me far less industrious. The Rio Manipiare, one of the principal branches of the

* Palma del Cucurito.

† Rio Manapiari, according to the pronunciation of the Indians of Esmeralda.
Ventuari, approaches near its source those lofty mountains, the northern ridge of which gives birth to the Cuchivero. It is a prolongation of the chain of Baraguan; and there Father Gili places the table-land of Siamacu, of which he vaunts the temperate climate*. The upper course of the Rio Ventuari, beyond the confluence of the Asisi and the Great Raudales, is almost unknown. I was informed only, that the Upper Ventuari bends so much toward the east †, that the ancient road from Esmeralda to the Rio Caura crosses the bed of the river. The proximity of the tributary streams of the Carony, the Caura, and the Ventuari, has facilitated for ages the appearance of the Caribbees on the banks of the Upper Oroonoko. Bands of this warlike and trading people went up from the Rio Carony, by the Paragua, to the sources of the Paruspa. A portage conducted them to the Chavarro, an eastern tributary stream of the Rio Caura; they descended with their canoes first this stream, and then the Caura itself, as far as the mouth of the Erevato. After having gone up this last river toward the southwest, and traversed vast savannahs for three days, they entered by the Manipiare into the great Rio Ventuari‡. I trace this road with

* See above, p. 565. † See above, p. 572, note.
‡ The Rio Cuyuni, the Paragua, and the tributary streams of the Caura (the Chavarro and the Erevato), flow
precision, not only because it was that by which the traffic of native slaves was carried on, but also to call the attention of those men, who at some future day shall govern Guyana, to the high importance of this labyrinth of rivers.

It is by the four largest tributary streams, which the majestic river of the Oroonoko receives on the right, the Carony, the Caura, the Padamo, and the Ventuari, that European civilization will one day penetrate into this country of forests and mountains, which has a surface of 10,600 square leagues, and which is surrounded by the Oroonoko on the north, the west, and the south. The Capuchins of Catalonia, and the Observantins of Andalusia and Valentia, have already made settlements in the valleys of the Carony and the Caura. The tributary streams of the Lower Oroonoko, being the nearest to the coast and the cultivated region of Venezuela, were naturally the first to receive missionaries, more or less in the direction of the latitude; so that, with the exception of a few portages, there is a navigation from east to west, going from Essequibo and Demerary, for a distance of one hundred and forty leagues, in the latitude of 6° and 7°. This navigation is performed in the interior, parallel to the course of the Lower Oroonoko, remaining from thirty to forty leagues distant from this great river to the south. This course may be compared in little to the great line of navigation established in Siberia from west to east, by the uniform direction of the tributary streams of the Obi, the Jenisei, and the Lena.
and with them some germes of social life. In 1797, the settlements of the Capuchins on the Rio Caroni already contained 16,600 Indians, peaceably inhabiting villages; while at the Rio Caura, under the government of the Observants, there was at that period, according to enumerations alike official, only 640. This difference results from the vast extent and excellence of the pastures on the banks of the Caroni, the Upatu, and the Cuyuni, the proximity of the mouths of the Oroonoko, and of the capital of Guyana, to the missions of the Capuchins; and finally, from the interior government, the active industry, and the mercantile spirit of the Catalanian monks. Corresponding to the Caroni and the Caura, which flow toward the north, are two great tributary streams of the Upper Oroonoko, that send their waters toward the south; these are the Padamo and the Ventuari. No village has hitherto risen on their banks, though they offer advantages for agriculture and pasturage, which would be sought in vain in the valley of the immense river, to which they are tributary. In the centre of these savage countries, where there will long be no other road than the rivers, every project of civilization should be founded on an intimate knowledge of the hydraulic system, and the relative importance of the tributary streams.

In the morning of the 26th of May we left the
little village of Santa Barbara, where we found several Indians of Esmeralda, who had come with great regret, by order of the missionary, to construct a house for him of two stories. During the whole day we enjoyed the view of the fine mountains of Sipapo *, which rise at a distance of more than eighteen leagues toward the north-north-west. The vegetation of the banks of the Oroonoko is singularly varied in this part of the country; the arborescent ferns † descended from the mountains, and mingled with the palm-trees of the plain. We rested that night on the island of Minisi; and, after having passed the mouths of the little rivers Quejanuma, Ubua, and Masao, we arrived, on the 27th of May, at San Fernando de Atabapo. It was a month since we had lodged in the same house belonging to the president of the missions when going up the Rio Negro. We then directed our course toward the south, by the Atabapo and the Temi; we now returned from the west, having made a long circuit by the Cassiquiare and the Upper Oroonoko. During this long absence, the president of the missions had conceived serious inquietudes respecting the

* See above, p. 175.
† The geographical distribution of these plants is extremely singular. Scarcely any are found on the eastern coast of Brazil. (See the interesting work of Prince Maximilian of Neuwied, Reise nach Brasilien, vol. i. p. 274.)
real object of our journey, my connections with the higher clergy of Spain, and the knowledge I had acquired of the state of the missions. At the moment of our departure for Angostura, the capital of Guyana, he pressed me earnestly to leave a writing in his hands, bearing testimony to the good order, that prevailed in the Christian settlements on the Oroonoko, and the mildness with which the natives are generally treated. This proposition of the superior, arising from a praiseworthy zeal for the good of his order, embarrassed me a little. I answered, that the testimony of a traveller born in the bosom of the Calvinist church could scarcely have any weight in the interminable quarrels, which almost everywhere, in the New World, divide the secular and ecclesiastical powers. I hinted to him, that, being two hundred leagues from the coast, in the centre of the missions, and, as the inhabitants of Cumana say archly, en el poder de los frayles*, a writing, which we should compose together on the banks of the Atabapo, would not perhaps appear an act freely consented to on my part. The president was not alarmed at the idea of having treated with hospitality a Calvinist; the first, I believe, who had been seen in the missions of Saint Francis; but the missionaries in America cannot be accused of

* In the power of the monks.
intolerance. They are not occupied by the heresies of Europe, except perhaps on the confines of Dutch Guyana, where the preachers think proper also to go on missions. The president insisted no longer on the writing which I was to sign, and we availed ourselves of the few moments that remained, to discuss with frankness the situation of the country, and the hope of making the Indians participate in the benefits of civilization. I insisted on the evil, which had arisen from the entradas, or hostile incursions; on the little advantage, which the natives derived from the fruits of their labours; on the journeys which they were compelled to make for concerns that were not their own; finally, on the necessity of bestowing some education in a particular college on the young ecclesiastics, who were called to govern very numerous communities. The president seemed to listen to me placidly. I believe, however, he would have wished (no doubt from zeal for the sciences), that those who gather plants, and examine rocks, would renounce that indiscreet interest in the copper-coloured race, and in the affairs of human society in general. This desire is common enough in both worlds; and is found wherever authority is disquieted, because it believes itself not firmly seated.

We remained only one day at San Fernando de Atabapo, although this village, embellished
by the pihiguao palm-tree *, with fruit like peaches, appeared to us a delicious abode. Tame *pauxis † surrounded the Indian huts; in one of which we saw a very rare monkey, that inhabits the banks of the Guaviare. This monkey is the caparro, which I have made known in my Observations de Zoologie et d'Anatomie comparée ‡, and which forms, as Mr. Geoffroy believes, a new genus (lagothrix) between the atelels, and the alouates. The hair of this monkey is a gray like that of the marten, and extremely soft to the touch. The caparro is distinguished by a round head, and a mild and agreeable expression of countenance. I believe the missionary Gili § is the only author, who has made mention before me of this curious animal, around which zoologists begin to group other monkeys of Brazil. Having quitted San Fernando May the 27th, we arrived, by favor of the rapid current of the Oroonoko, in seven hours at the mouth of the Rio Mataveni. We passed the night in the open air, under the granitic rock El Castillito ‖, which rises in the middle of the

* See above, Chap. xxii, p. 213.
† Not the ourax of Cuvier (crax pauxi, Lin.), but the orax alector.
‡ Vol. i, p. 322, 354.
§ "During the eighteen years, which I passed in the missions of the Oroonoko, I saw only one caparro. Gili, vol. i, p. 240.
‖ See above, Chap. xxi, p. 192.
river, and the form of which reminded us of the Mausethurm of the Rhine, opposite Bingen. Here, as on the banks of the Atabapo, we were struck by the sight of a small species of drosera, having altogether the appearance of the drosera of Europe.

The Oroonoko had sensibly swelled during the night; and the current, strongly accelerated, bore us in ten hours from the mouth of the Mataveni to the Upper Great Cataract, that of the Maypures, or Quittuna. The distance passed over was thirteen leagues. We recalled to mind with much satisfaction the scenes, where we had reposed in going up the river; we found again the Indians, who had accompanied us in our herbalizations; and we visited anew the fine spring*, that issues from a rock of stratified granite behind the house of the missionary: it's temperature was not changed more than 0·3°. From the mouth of the Atabapo as far as that of the Apure we travelled as through a country which we had long inhabited. We were reduced to the same abstinence; we were stung by the same moschettoes; but the certainty of reaching in a few weeks the term of our physical sufferings kept up our spirits.

The passage of the canoe through the Great Cataract obliged us to stop two days at May-

* It was 27·8° cent. on the 19th of April; I found it on the 30th of May 27·5°.
pures. Father Bernardo Zea, missionary at the Raudals, who had accompanied us to the Rio Negro, though ill, would conduct us with his Indians as far as Atures. One of them, Zerepe, the interpreter, who had been so unmercifully beaten at the beach of Pararuma *, fixed our attention by an expression of deep sorrow. We learned, that he had just lost a girl to whom he was engaged, and he had lost her in consequence of false intelligence, which had been spread respecting the direction of our voyage. Born at Maypures, Zerepe had been brought up in the woods by his parents, who were of the tribe of the Macoes. He had brought with him to the mission a girl of twelve years of age, whom he intended to marry at our return from the Cataracts. The Indian girl was little pleased with the life of the missions, and she was told, that the whites would go to the country of the Portugueze (Brazil), and would take with them Zerepe. Disappointed in her hopes, she seized a boat, and, with another girl of her own age, crossed the Great Cataract, and fled al monte. The recital of this act of courage was the great news of the place. The affliction of Zerepe however was not of long duration; born among the Christians, having travelled as far as the foot of the Rio Negro, understanding Spanish and the language of the Macoes, he thought

* See above, chap. xix, p. 531, 532:
himself superior to the people of his tribe. How then could he fail to forget a girl born in the forest?

On the 31st of May we passed the rapids of Guahiboês and Garcita. The islands, which rise in the middle of the waters of the river, shone with the purest verdure. The rains of winter had unfolded the spathes of the **vadgiai** palm-tree, the leaves of which rise straight toward the sky*. The eye is never wearied of the view of those scenes, where the trees and rocks give the landscape that great and severe character, which is marked in the arts by the name of the **heroic landscape**. We landed before sunset on the eastern bank of the Oroonoko, at the **Puerto de la Expedicion**, in order to visit the cavern of Ataruipe, of which I have spoken above †, and which is the place of sepulchre of a whole nation destroyed. I shall attempt to describe this cavern, so celebrated among the natives.

We climbed with difficulty, and not without some danger, a steep rock of granite, entirely bare. It would have been almost impossible to fix the foot on it's smooth and sloping surface, if large crystals of feldspar, resisting decomposition, did not stand out from the rock, and fur-

* See above, chap. xx, p. 50.
† See above, chap. xx, p. 72; and chap. xxi, p. 119.
nish points of support. Scarcely had we attained the summit of the mountain, when we beheld with astonishment the singular aspect of the surrounding country. The foamy bed of the waters is filled with an Archipelago of islands covered with palm-trees. Toward the west, on the left bank of the Oroonoko, stretch the savannahs of the Meta and the Casanare. They resembled a sea of verdure, the misty horizon of which was illumined by the rays of the setting sun. It's orb, resembling a globe of fire, suspended over the plain; and the solitary Peak of Uniana, which appeared more lofty from being wrapped in vapours that softened it's outline; all contributed to augment the majesty of the scene. Near us the eye looked down into a deep valley, enclosed on every side. Birds of prey and goatsuckers winged their lonely flight in this inaccessible circus. We found a pleasure in following with the eye their fleeting shadows, as they glided slowly over the flanks of the rock.

A narrow ridge led us to a neighbouring mountain, the rounded summit of which supported immense blocks of granite. These masses are more than forty or fifty feet in diameter; and their form is so perfectly spherical, that, appearing to touch the soil only by a small number of points, it might be supposed, at the least shock of an earthquake they
would roll into the abyss. I do not remember to have seen any where else a similar phenomenon, amid the decompositions of granitic soils. If the balls rested on a rock of a different nature, as it happens in the blocks of Jura, we might suppose, that they had been rounded by the action of water, or thrown out by the force of an elastic fluid; but their position on the summit of a hill alike granitic makes it more probable, that they owe their origin to the progressive decomposition of the rock.

The most remote part of the valley is covered by a thick forest. In this shady and solitary spot, on the declivity of a steep mountain, the cavern of Ataruipe opens itself; it is less a cavern than a jutting rock, in which the waters have scooped a vast hollow, when, in the ancient revolutions of our planet, they attained that height*. We soon reckoned in this tomb of a whole extinct tribe near six hundred skeletons well preserved, and so regularly placed, that it would have been difficult to make an error in their number. Every skeleton reposes in a sort of basket, made of the petioles of the palm-tree.

* I saw no vein, no four filled with crystal. (See vol. iii, p. 138.) The decomposition of granitic rocks, and their separation into large masses, dispersed in the plains and valleys under the form of blocks and of balls with concentric layers, appear to favor the enlarging of these natural excavations, which resemble real caverns.
These baskets, which the natives call *mapires*, have the form of a square bag. Their size is proportioned to the age of the dead; there are some for infants cut off at the moment of their birth. We saw them from ten inches to three feet four inches long, the skeletons in them being bent together. They are all ranged near each other, and are so entire, that not a rib, or a phalanx is wanting. The bones have been prepared in three different manners, either whitened in the air and the sun; dyed red with onoto, a colouring matter extracted from the bixa orellana; or, like real mummies, varnished with odoriferous resins, and enveloped in leaves of the heliconia or of the plantain tree. The Indians related to us, that the fresh corpse is placed in damp ground, in order that the flesh may be consumed by degrees; some months after, it is taken out, and the flesh remaining on the bones is scraped off with sharp stones. Several hordes in Guyana still observe this custom. Earthen vases half-baked are found near the *mapires*, or baskets. They appear to contain the bones of the same family. The largest of these vases, or funeral urns, are three feet high, and five feet and a half long. Their colour is greenish gray; and their oval form is sufficiently pleasing to the eye. The handles are made in the shape of crocodiles, or serpents; the edge is bordered with meanders, labyrinths, and
real *grecques*, in straight lines variously combined. Such paintings are found in every zone, among nations the most remote from each other, either with respect to the spot which they occupy on the Globe, or to the degree of civilization which they have attained. The inhabitants of the little mission of Maypures still execute them on their commonest pottery*; they decorate the bucklers of the Otaheiteans, the fishing implements of the Eskimos, the walls of the Mexican palace of Mitla†, and the vases of ancient Greece. Every where a rhythmic repetition of the same forms flatters the eye, as the cadenced repetition of sounds soothes the ear. Analogies founded on the internal nature of our feelings, on the natural dispositions of our intellect, are not calculated to throw light on the filiation and the ancient connections of nations.

We could not acquire any precise idea of the period, to which the origin of the *mapires* and the painted vases, contained in the ossuary cavern of Ataruipe, can be traced. The greater part seemed not to be more than a century old; but it may be supposed, that, sheltered from all humidity, under the influence of a uniform tem-

* See above, chap. xxi, p. 154.
† See my *Views of the Cordilleras, and Monuments of the Ancient Inhabitants of America*, Pl. 50. [Vol. ii, English edition, or xiv of the present work, p. 158, Pl. 19.]
perature, the preservation of these articles would be no less perfect, if it dated from a period far more remote. A tradition circulates among the Guahiboes, that the warlike Atures, pursued by the Caribbees, escaped to the rocks that rise in the middle of the Great Cataracts; and there that nation, heretofore so numerous, became gradually extinct, as well as it's language*. The last families of the Atures still existed in 1767, in the time of the missionary Gili. At the period of our voyage an old parrot was shown at Maypures, of which the inhabitants related, and the fact is worthy of observation, that, "they did not understand what it said, because it spoke the language of the Atures."

We opened, to the great concern of our guides, several mapires, in order to examine attentively the form of the skulls; they all displayed the characteristics of the American race, with the exception of two or three, which approached indubitably to the Caucasian. We have observed above†, that in the middle of the Cataracts, in the most inaccessible spots, cases are found strengthened with iron bands, and filled with European tools, vestiges of clothes, and glass trinkets. These articles, which have given rise to the most absurd reports of treasures hidden

* See above, chap. xx, p. 13; and chap. xxi, p. 144.
† See above, chap. xxi, p. 121.
by the Jesuits, probably belonged to Portugueze traders, who had penetrated into these savage countries. Now may we suppose, that the skulls of European race, which we saw mingled with the skeletons of the natives, and preserved with the same care, were the remains of some Portugueze travellers, who had died of sickness, or had been killed in battle? The aversion which the natives affect for whatever is not of their own race renders this hypothesis little probable. Perhaps fugitive mestizoes of the missions of the Meta and Apure may have come and settled near the Cataracts, marrying women of the tribe of the Atures. Such mixed marriages sometimes take place in this zone, though they are more rare than in Canada, and in the whole of North America, where hunters of European origin unite themselves with savages, assume their habits, and sometimes acquire great politi-
cal influence.

We took several skulls, the skeleton of a child of six or seven years old, and two of full-grown men of the nation of the Atures, from the cavern of Ataruipe. All these bones, partly painted red, partly varnished with odoriferous resins, were placed in the baskets (mapires or canastos), which we have just described. They made almost the whole load of a mule; and as we knew the superstitious aversion of the Indians for dead bodies, when they have given them sepulture,
we had carefully enveloped the *canastos* in mats recently woven. Unfortunately for us, the penetration of the Indians, and the extreme quickness of their senses, rendered all our precautions useless. Wherever we stopped, in the missions of the Caribbees, amid the Llanos, between Angostura and Nueva Barcelona, the natives assembled round our mules to admire the monkeys which we had purchased at the Oroonoko. These good people had scarcely touched our baggage, when they announced the approaching death of the beast of burden, "that carried the dead." In vain we told them, that they were deceived in their conjectures; and that the baskets contained the bones of crocodiles and manatees: they persisted in repeating, that they smelt the resin, that surrounded the skeletons, and "that they were their old relations." We were obliged to make the monks interpose their authority, in order to conquer the aversion of the natives, and procure for us a change of mules.

One of the skulls, which we took from the cavern of Ataruipe, has appeared in the fine work published by my old master, Blumenbach, on the varieties of the human species. The skeletons of the Indians were lost on the coast of Africa, together with a considerable part of our collections, in a shipwreck, in which perished our friend and fellow-traveller, Fray Juan Gon-
zales *, a young monk of the order of Saint Francis.

We withdrew in silence from the cavern of Ataruipe. It was one of those calm and serene nights, which are so common in the torrid zone. The stars shone with a mild and planetary light. Their scintillation was scarcely sensible at the horizon†, which seemed illumined by the great nebulæ of the southern hemisphere. An innumerable multitude of insects spread a reddish light on the ground, loaded with plants, and resplendent with these living and moving fires, as if the stars of the firmament had sunk down on the savannah. On quitting the cavern, we stopped several times to admire the beauty of this singular scene. The odoriferous vanilla, and festoons of bignonia, decorated the entrance; and above, on the summit of the hill, the arrowy branches of the palm-trees waved murmuring in the air‡.

We descended toward the river, to take the road to the mission, where we arrived late in the night. Our imagination was struck by all we had just seen. Occupied continually by the present, in a country where the traveller is tempted

* See vol. iii, chap. 11, p. 350.
† See chap. x and xiii, vol. iii, p. 314 and 538.
‡ See the third discourse delivered at one of the public sittings of the Academy of Berlin. (Tableaux de la Nature, traduites de l'Allemand par M. Eyriès, vol. ii, p. 231.)
to regard human society as a new institution, he is more powerfully interested by remembrances of times past. These remembrances were not indeed of a distant date; but in all that is monumental antiquity is a relative idea, and we easily confound what is ancient with what is obscure and problematic. The Egyptians considered the historical remembrances of the Greeks as very recent. If the Chinese, or, as they prefer calling themselves, the inhabitants of the celestial empire, could have communicated with the priests of Heliopolis, they would have smiled at those pretensions of the Egyptians to antiquity. Contrasts not less striking are found in the north of Europe and of Asia, in the New World, and in every region, where the human race has not preserved a long consciousness of itself. The migration of the Toltecks, the most ancient historical event on the table-land of Mexico, dates only in the sixth age of our æra. The introduction of a good system of intercalation, and the reform of the calendars, the indispensable basis of an accurate chronology, took place in the year 1091. These epochas, which to us appear so modern, fall on fabulous times, when we reflect on the history of our species between the banks of the Oroonoko and the Amazon. We there see symbolic figures sculptured on the rocks, but no tradition throws light upon their origin. In the hot part of
Guyana we can go back only to the period, when the Castillian and Portugueze conquerors, and more recently peaceful monks, penetrated amid so many barbarous nations.

It appears, that, to the north of the Cataracts, in the strait of Baraguan, there are caverns filled with bones, similar to those which I have just described*: but I was informed of this fact only after my return; our Indian pilots did not mention it, when we landed at the strait. These tombs no doubt have given rise to a fable of the Otomacs, according to which the granitic and solitary rocks of Baraguan, the forms of which are very singular, are regarded as the grandfathers, the ancient chiefs of the tribe. The custom of separating the flesh from the bones, very anciently practised by the Massagetes, is still known among several hordes of the Oroonoko. It is even asserted, and with some probability, that the Guaraons plunge their dead bodies under water enveloped in nets; and, that the small caribe fishes†, the serra-salmes, of which we saw every where an innumerable quantity, devour in a few days the muscular flesh, and thus prepare the skeleton. It may be supposed, that this operation can be practised only in places where crocodiles are not common.

† See vol. iv, p. 443.
Some tribes, for instance the Tamanacs, are accustomed to lay waste the fields of the deceased, and cut down the trees which he has planted. They say, "that the sight of objects, which belonged to their relations, makes them melancholy." They like better to efface than to preserve remembrances. These effects of Indian sensibility are very detrimental to agriculture, and the monks oppose with energy these superstitious practices, to which the natives converted to Christianity still adhere in the missions.

The tombs of the Indians of the Oroonoko have not been sufficiently examined, because they do not contain valuable articles like those of Peru; and even on the spot no faith is now lent to the chimerical ideas, which were heretofore formed of the wealth of the ancient inhabitants of Dorado. The thirst of gold everywhere precedes the desire of instruction, and a taste for researches into antiquity; in all the mountainous part of South America, from Merida and Santa Marta to the table-lands of Quito and Upper Peru, the labours of absolute mining have been undertaken to discover tombs, or, as the Creoles say, employing a word altered from the language of the Incas, guacas. When in Peru, at Mancichi, I went into the guaca of Toledo, from which masses of gold were extracted, of the value, in the sixteenth century*, of five

* I found this calculation on the fifth paid in 1576, and
millions of franks. No trace of the precious metals has been found in the caverns, which have served the natives of Guyana for ages as sepulchres. This circumstance proves, that, even at the period when the Caribbees, and other travelling nations, made incursions to the southwest, gold had flowed in very small quantities from the mountains of Peru toward the eastern plains.

Wherever the granitic rocks do not furnish any of those large cavities, that are owing to their decomposition, or an accumulation of their blocks, the Indians confide the dead to the earth itself. The hammock (chinchorro), a kind of net in which the deceased had reposed during his life, serves him for a coffin. This net is fastened tight around the body, a hole is dug in the hut, and there the dead is laid. This is the most usual method, according to the report of the missionary Gili, and what I myself learned from Father Zea. I do not believe, that there exists one tumulus in Guyana, not even in the plains of the Cassiquiare and the Essequibo. Some however are to be met with in the savannahs of 1592, into the treasury (Caxas reales) of Truxillo. The registers have been preserved. In Persia, in Upper Asia, and in Egypt, where the tombs have been searched at very different periods, no such immense treasures, I believe, have ever been found.
Varinas*, as in Canada, to the west of the Alleghenies†. It seems remarkable enough, that, notwithstanding the extreme abundance of wood in those countries, the natives of the Oroonoko were as little accustomed as the ancient Scythians to burn the dead. They formed funeral piles for this purpose sometimes after a battle only, when the number of the dead was considerable. Thus, in 1748, the Parecas burned not only the bodies of their enemies, the Tamanacs, but also those of their own relations, who fell on the field of battle. The Indians of South America, like all nations that live in a state of nature, are strongly attached to the spots, where the bones of their fathers repose. This feeling, which a great writer has painted in a manner so affecting in the episode of Atala, is cherished in all it's primitive ardour by the Chinese. These people, among whom every thing is the produce of art, or rather of the most ancient civilization, do not change their dwelling without carrying along with them the bones of their ancestors.

* Near Mijagual. See vol. iv, p. 314.

† This kind of mummies and skeletons contained in baskets were recently discovered in a cavern in the United States. It is believed, they belong to a race of men analogous to that of the Sandwich Islands. The description of these tombs (Mitchell, in the Bibli. Univ., Août, 1817, p. 335) has however some similitude with that of the tombs of Ataruipe.
Coffins are seen deposited on the banks of great rivers, in order to be transported, with the furniture of the family, to a remote province. These removals of bones, heretofore more common among the savages of North America, is not practised among the tribes of Guyana; but these are not nomades, like nations that live exclusively by hunting.

We staid at the mission of Atures only the time necessary for passing the canoe through the Great Cataract. The bottom of our frail bark was become so thin, that it required great care, to prevent it from splitting. We took leave of the missionary, Bernardo Zea, who remained at Atures, after having accompanied us during two months, and shared all our sufferings. This poor monk continued to have the same fits of a tertian ague; but to him they had become an habitual evil, to which he paid little attention. Other fevers of a more destructive kind prevailed at Atures, at our second visit. The greater part of the Indians could not leave their hammocks, and we were obliged to send in search of cassava bread, the most indispensable food of the country, to the independant but neighbouring tribe of the Piraoas. We had hitherto escaped

* The missionaries of the United States complain of the noisome smell, that is diffused by the Nanticokes, when travelling with the bones of their ancestors. *Histoire trans.*, 1819, vol. i, p. 75.
these malignant fevers, which, I believe, are not contagious.

We ventured to pass in our canoe through the latter half of the Raudal of Atures. We landed here and there, to climb upon the rocks, which like narrow dikes joined the islands to one another. Sometimes the waters precipitate themselves over the dikes, sometimes they fall within them with a hollow noise. A considerable portion of the Oroonoko was dry, because the river had found an issue by subterraneous caverns. In these solitary haunts the rock manakin with gilded plumage (pipra rupicola), one of the most beautiful birds of the tropics, builds its nest. The Raudalito of Carucari is caused by an accumulation of enormous blocks of granite. These blocks, several of which are spheroids of five or six feet in diameter, are piled together in such a manner, as to form spacious caverns. We entered one of these caverns, to gather the confervas, that were spread over the clefts and humid sides of the rock. This spot displayed one of the most extraordinary scenes of nature, that we had contemplated on the banks of the Oroonoko. The river rolled its waters turbulently over our heads*. It seemed as if it were the sea dashing against reefs of rocks; but at the entrance of the cavern we

* See above, chap. 20, p. 54.
could remain dry beneath a large sheet of water, that precipitated itself in an arch from above the barrier. In other cavities, deeper, but less spacious, the rock was pierced by the effect of successive filtrations. We saw columns of water, eight or nine inches broad, descend from the top of the vault, and find an issue by clefts, that seemed to communicate at great distances with each other.

The cascades of Europe, forming only one fall, or several falls close to each other, can never produce such variety in the shifting landscape. This variety is peculiar to *rapids*, to a succession of small cataracts several miles in length, to rivers that force their way across rocky dikes and accumulated blocks of granite. We enjoyed this extraordinary sight longer than we wished. Our boat was to coast the eastern bank of a narrow island, and to take us in again after a long circuit. We passed an hour and half in vain expectation of it. Night approached, and with it a tremendous storm. It rained with violence. We began to fear, that our frail bark had been wrecked against the rocks, and that the Indians, conformably to their habitual indifference for the evils of others, had returned tranquilly to the mission. We were only three persons: completely wet, and uneasy respecting the fate of our boat, it appeared far from agreeable to us, to pass, without sleep, a long night of the
torrid zone, amid the noise of the Raudales. M. Bonpland resolved to leave me in the island with don Nicolas Sotto*, and swim across the branches of the river, that are separated by the granitic dikes. He hoped to reach the forest, and seek assistance at Atures from Father Zea. We dissuaded him with difficulty from undertaking this hazardous enterprise. He knew little of the labyrinth of small channels, into which the Oroonoko is divided. Most of them have strong whirlpools, and what passed before our eyes, while we were deliberating on our situation, proved sufficiently, that the natives had deceived us respecting the absence of crocodiles in the cataracts. The little monkeys, which we had carried along with us for months, were deposited on the point of our island. Wet by the rains, and sensible of the least lowering of the temperature, these delicate animals sent forth plaintive cries, and attracted to the spot two crocodiles, the size and leaden colour of which denoted their great age. Their unexpected appearance made us reflect on the danger we had run in bathing, at our first passing by the mission of Atures, in the middle of the Raudal. After long waiting, the Indians at length arrived at the close of day. The natural coffer-dam, by which they had endeavoured to

* See vol. iv, chap. 18, p. 416.
descend, in order to make the circuit of the island, had become impassable, on account of the little depth of the water. The pilot sought a long while for a more accessible passage in this labyrinth of rocks and islands. Happily our canoe was not damaged, and in less than half an hour our instruments, provision, and animals, were embarked.

We navigated part of the night, to pitch our tent again in the island of Panumana. We recognized with pleasure the spots, where we had herbalized when going up the Oroonoko. We examined once more on the beach of Guachaco that small formation of sand stone, which reposes directly on granite. It's position is the same as that of the sandstone, which my unfortunate countryman, Mr. Burckhardt, observed at the entrance of Nubia, superimposed on the granite of Syene. We passed, without visiting it, the new mission of San Borga, where (as we learned with much regret a few days after) the little colony of Guahiboes had fled al monte, from the chimerical fear, that we should carry them off, to sell them as poitos, or slaves *. After having passed the rapids of Tabaje, and the Raudal of Cariven, near the mouth of the great Rio Meta, we arrived without accident at Carichana. The missionary † received us with

* See vol. iv, chap. 19, p. 571.
† Fray Jose Antonio de Torre.
that kind hospitality, which we had already enjoyed on our first passage. The sky was little favourable for astronomical observations; we had obtained some new ones in the two Great Cataracts; but thence, as far as the mouth of the Apure, we were obliged to renounce the attempt. Mr. Bonpland had the satisfaction at Carichana of dissecting a manatee more than nine feet long. It was a female, the flesh of which appeared to us not unsavoury. I have spoken in another place of the manner of catching this herbivorous cetacea*. The Piraoas, some families of whom inhabit the mission of Carichana, detest this animal to such a degree, that they hid themselves, to avoid being obliged to touch it, when it was conveying to our hut. They said, "that the people of their tribe die infallibly, when they eat of it." This prejudice is the more singular, as the neighbours of the Piraoas, the Guamoes and the Otomacs, are very fond of the flesh of the manatee. We shall soon see, that the flesh of the crocodile is also an object of horror to some tribes, and of predilection to others.

The island of Cuba furnishes a fact little known in the history of the manatee. South of the port of Xagua, several miles from the coast, there are springs of fresh water in the middle of the sea. They are supposed to be owing to a

* See vol. iv, chap. 18, p. 447.
hydrostatic pressure exerted in subterraneous channels, that communicate with the lofty mountains of Trinidad. Small vessels sometimes take in water there; and, what is well worthy of observation, large manatees remain habitually in those spots. I have already called the attention of naturalists to the crocodiles that advance from the mouth of rivers far into the sea*. Analogous circumstances may have caused, in the ancient catastrophes of our planet, that singular mixture of pelagian and fluviatile bones and petrifactions, which is observed in some rocks of recent formation.

Our stay at Carichana was very useful in recruiting us from our fatigues. Mr. Bonpland bore with him the germe of a cruel malady; he stood in need of repose; but, as the delta of the tributary streams† included between the Horeda and Paruasi is covered with a rich vegetation, he made long herbalizations, and was wet through several times in a day. We found fortunately in the house of the missionary the most attentive care; bread was procured for us of the flour of maize, and even milk. The cows yield milk plentifully in the lower regions of the torrid zone, wherever good pasturage is found. I insist on this fact, because local circum

* See vol. iii, chap. 11, p. 360.
† See above, chap. 23, p. 465, 466.
stances have spread through the Indian Archipe-
lago the prejudice of considering hot climates as repugnant to the secretion of milk. We may con-
ceive the indifference of the natives of the New World for a milk diet, the country having been originally destitute of animals capable of furnishing it*; but how can we avoid being aston-
ish ed at this indifference in the immense Chinese population, living in great part without the tropics, and in the same latitude with the nomade and pastoral tribes of central Asia? If the Chinese have ever been a pastoral people, how have they lost the tastes and the habits so intimately con-
nected with this state, which precedes agricul-
tural institutions? These questions appear to me extremely interesting with respect both to the history of the nations of oriental Asia, and

* See chap. 17, vol. iv, p. 317; and chap. 22, p. 271 of the present volume. The rein-deer are not domesticated in Greenland as they are in Lapland; and the Eskimoes care little for their milk. The bisons taken very young accustom themselves, on the west of the Alleghanies, to graze with the herds of European cows. The females in some districts of India yield a little milk, but the savages have never thought of milking them. What is the origin of that fabulous story related by Gomara (chap. 43, p. 36), according to which the first Spanish navigators saw, on the coast of South Carolina, "stags led to the savannahs by herdsmen?" The females of the bison, according to Mr. Buchanan and the philoso-
phical historian of the Indian Archipelago, Mr. Crawford, yield more milk than common cows.
to the ancient communications that are supposed to have existed between that part of the world and the north of Mexico.

We went down the Oroonoko in two days, from Carichana to the mission of Uruana, after having again passed the celebrated strait of Baraguan*. We stopped several times to determine the velocity of the river, and its temperature at the surface, which was 27.4°. The velocity was found to be two feet in a second (sixty-two toises in 3' 6''), in places where the bed of the Oroonoko was more than twelve thousand feet broad, and from ten to twelve fathoms deep. The slope of the river is in fact extremely gentle from the Great Cataraicts to Angostura†; and, if a barometric measurement were wanting, the difference of height might be determined by approximation, by measuring from time to time the velocity of the stream, and the extent of the section in breadth and depth‡. We had some observations of the

* See vol. iv, chap. 19, p. 502.
† The descent of the Nile also, from Cairo to Rosetta, a distance of fifty-nine leagues (at 2273 t.), is only four inches in a league. Descr. de l' Egypte Moderne, vol. i, p. 58.
‡ Edinburgh Review, vol. xxiv, p. 414. According to Clark and Lewis, the velocity of the Missouri, near where it flows into the Mississipi, is seven feet in a second, and in some places more than twelve feet; which equals the velocity of the Cassiquiare. See above, p. 418.
stars at Uruana. I found the latitude of the mission to be 7° S'; but the results from different stars left a doubt of more than 1'. The stratum of moschettoes, which hovered over the ground, was so thick, that I could not succeed in rectifying properly the artificial horizon. I tormented myself in vain; and regretted, that I was not provided with a mercurial horizon. On the 7th of June, good absolute altitudes of the Sun* gave me 69° 40' for the longitude. We had advanced from Esmeralda 1° 17' toward the west; and this chronometric determination merits entire confidence, on account of the double observations, made in going and returning, at the Great Cataracts, and at the confluence of the Atabapo and of the Apure.

The situation of the mission of Uruana is extremely picturesque. The little Indian village is placed at the foot of a lofty granitic mountain. Rocks everywhere appear in the form of pillars above the forest, rising higher than the tops of the tallest trees. The Oroonoko no where dis-

* The partial heights do not differ 2". In these places, filled with venomous insects, observations are made most favourably by day. The meridian altitudes of the Sun may be taken by means of a reflecting instrument, in which the parallelism of the great and little mirror corresponds with a point of the limb twenty-five or thirty degrees beyond the commencement of the division. (Obs. Astr., vol. i, p. xv, 222, 262; and 272).
plays a more majestic aspect, than when contemplated from the hut of the missionary, Fray Ramon Bueno. It is more than two thousand six hundred toises broad*, and runs without any winding, like a vast canal, straight toward the east. Two long and narrow islands (Isla de Uruana and Isla vieja de la Manteca) contribute to give extent to the bed of the river; the two banks are parallel, and we cannot call it divided into different branches. The mission is inhabited by the Otomacs†, a tribe in the rudest state, and presenting one of the most extraordinary physiological phenomena. The Otomacs eat earth; that is, they swallow every day, during several months, very considerable quantities, to appease hunger, without injuring their health. Since my return to Europe, this incontestable fact has become a subject of warm dispute, because two assertions have been confounded together, which are extremely different; that of eating earth, and that of being nourished by it. Though we could stay only one day at Uruana, this short space of time sufficed to instruct us in the preparation of the poya (or balls of earth). I also found some traces of this vitiated appetite among the Guamoes; and between the confluence of the Meta and the Apure,

* Base, 140 metres, angles 90° and 88° 27' 40". Breadth 5211 metres.
† Otomacos in Spanish, Ottomacu in Indian.
where every body speaks of geophagy as of a thing anciently known. I shall here confine myself to an account of what we ourselves saw, or heard from the missionary, whom an unhappy fatality had doomed to live for twelve years among the savage and turbulent tribe of the Otomacs.

The inhabitants of Uruana belong to those nations of the savannahs (Indios andantes), who, more difficult to civilize than the nations of the forest* (Indios del monte), have a decided aversion to cultivate the land, and live almost exclusively on hunting and fishing. They are men of a very robust constitution; but ugly, savage, vindictive, and passionately fond of fermented liquors. They are omnivorous animals in the highest degree; and therefore the other Indians, who consider them as barbarians, have a common saying, "nothing is so disgusting, that an Otomac will not eat it." While the waters of the Oroonoko and its tributary streams are low, the Otomacs subsist on fish and turtles. The former they kill with surprising dexterity, by shooting them with an arrow, when they appear at the surface of the water. When the rivers swell, which in South America, as well as in Egypt and in Nubia, is erroneously attributed to the melting of the snows, and which occurs

* On the difference between them, see above, p. 271.
periodically in every part of the torrid zone, fishing almost entirely ceases. It is then as difficult to procure fish in the rivers which are become deeper, as when you are sailing on the open sea. It often fails the poor missionaries, on fast days as well as flesh-days, though all the young Indians are under the obligation of "fishing for the convent." At the period of these inundations, which last two or three months, the Otomacs swallow a prodigious quantity of earth. We found heaps of balls in their huts, piled up in pyramids three or four feet high. These balls were five or six inches in diameter. The earth, which the Otomacs eat, is a very fine and unctuous clay, of a yellowish gray colour; and, being slightly baked in the fire, the hardened crust has a tint inclining to red, owing to the oxid of iron which is mingled with it. We brought away some of this earth, which we took from the winter provision of the Indians; and it is absolutely false, that it is steatitic, and contains magnesia. Mr. Vauquelin did not discover any traces of this earth in it; but he found, that it contained more silex than alumin, and three or four per cent of lime.

The Otomacs do not eat every kind of clay indifferently; they choose the alluvial beds or strata that contain the most unctuous earth, and the smoothest to the feel. I inquired of the missionary, whether the moistened clay were
made to undergo, as Father Gumilla asserts, that peculiar decomposition, which is indicated by a disengagement of carbonic acid and sulphuretted hydrogen, and which is designated in every language by the term of *putrefaction*; but he assured us, that the natives neither cause the *clay to rot*, nor do they mingle it with flour of maize, oil of turtles’ eggs, or fat of the crocodile. We ourselves examined, both at the Oroonoko and after our return to Paris, the balls of earth, which we brought away with us, and found no trace of the mixture of any organic substance, whether oily or farinaceous. The savage regards every thing as nourishing, that appeases hunger: when therefore you inquire of an Otomac, on what he subsists during the two months when the river is the highest, he shows you his balls of clayey earth. This he calls his principal food; for at this period he can seldom procure a lizard, a root of fern, or a dead fish swimming at the surface of the water. If the Indian eat earth from want during two months (and from three quarters to five quarters of a pound in twenty-four hours), he does not the less regale himself with it during the rest of the year. Every day in the season of drought, when

* Tienen hoyos en la qual hai greda fina, bien amasada, podrida a fuerza de continua agua, como la preparan los alfareros para hacer loza fina. *Gumilla, tom. i*, p. 200.
fishing is most abundant, he scrapes his balls of poya, and mingles a little clay with his other aliment. What is most surprising is, that the Otomacs do not become lean by swallowing such quantities of earth: they are, on the contrary, extremely robust, and far from having the belly tense and puffed up. The missionary Fray Ramon Bueno asserts, that he never remarked any alteration in the health of the natives at the period of the great risings of the Oroonoko.

The following are the facts in all their simplicity, which we were able to verify. The Otomacs during some months eat daily three quarters of a pound of clay slightly hardened by fire, without their health being sensibly affected by it. They moisten the earth afresh, when they are going to swallow it. It has not been possible to verify hitherto with precision how much nutritious vegetable or animal matter the Indians take in a week at the same time; but it is certain, that they attribute the sensation of satiety, which they feel, to the clay, and not to the wretched aliments which they take with it occasionally. No physiological phenomenon being entirely insulated, it may be interesting to examine several analogous phenomena, which I have been able to collect.

I observed everywhere within the torrid zone, in a great number of individuals, children, women, and sometimes even full-grown men, an
inordinate and almost irresistible desire of swallowing earth; not an alkaline or calcareous earth, to neutralize (as it is vulgarly said) acid juices, but a fat clay, unctuous, and exhaling a strong smell. It is often found necessary to tie the children's hands, or to confine them, to prevent their eating earth, when the rain ceases to fall. At the village of Banco, on the bank of the river Magdalena, I saw the Indian women who make pottery continually swallowing great pieces of clay. These women were not in a state of pregnancy; and they affirmed, that "earth is an aliment, which they do not find hurtful." In other American tribes people soon fall sick, and waste away, when they yield too much to this mania of eating earth. We found at the mission of San Borja an Indian child of the Guahiba nation, who was as thin as a skeleton. The mother informed us by an interpreter, that the little girl was reduced to this lamentable state of atrophy in consequence of a disordered appetite, having refused during four months to take almost any other food than clay. Yet San Borja is only twenty-five leagues distant from the mission of Uruana, inhabited by that tribe of the Otomacs, who, from the effect no doubt of a habit progressively acquired, swallow the poya without experiencing any pernicious effects. Father Gumilla asserts, that the Otomacs purge themselves with oil, or rather with the melted fat of
the crocodile, when they feel any gastric ob-
struictions; but the missionary whom we found
among them was little disposed to confirm this
assertion. It may be asked, why the mania of
eating earth is much more rare in the frigid and
temperate zones, than in the torrid; and why in
Europe it is found only among women in a state
of pregnancy, and sickly children. This differ-
ence between hot and temperate climates arises
perhaps only from the inert state of the functions
of the stomach, caused by strong cutaneous
perspiration. It has been supposed to be ob-
erved, that the inordinate taste for eating earth
augments among the African slaves, and becomes
more pernicious, when they are restricted to a
regimen purely vegetable, and deprived of spiri-
tuous liquors*. If the latter render the prac-
tice of eating earth less injurious, we may al-
most felicitate the Otomacs on their decided
taste for intoxication.

The Negroes on the coast of Guinea delight
in eating a yellowish earth, which they call
caouac. The slaves who are taken to America
try to procure for themselves the same enjoy-
ment; but it is constantly detrimental to their
health. They say, "that the earth of the West
Indies is not so easy of digestion as that of their
country." Thibaut de Chanvalon, in his Voy-

* Moreau de Jonnès Obs. on the Dirt-eaters in the West
Indies (Bullet. de la Soc. Méd., Mai, 1816).
age to Martinico, expresses himself very judiciously on this pathological phenomenon. "Another cause," he says, "of this pain in the stomach is, that several of the Negroes, who come from the coast of Guinea, eat earth; not from a depraved taste, or in consequence of a disease, but from a habit contracted at home in Africa, where they eat, they say, a particular earth, the taste of which they find agreeable, without suffering any inconvenience. They seek in our islands for the earth the most similar to this, and prefer a yellowish red volcanic tufa. It is sold secretly in our public markets; but this is an abuse, which the police ought to correct. The Negroes who have this habit are so fond of caouac, that no chastisement will prevent their eating it*."

In the Indian Archipelago, at the island of Java, Mr. Labillardière saw, between Surabaya and Samarang, little square and reddish cakes exposed to sale. These cakes, called tanaampo, were cakes of clay, slightly baked, which the natives eat with appetite†. The attention of physiologists, since my return from the Oroonoko, having been powerfully fixed on these phenomena of geophagy, Mr. Leschenault (one of the naturalists of the expedition to the Southern Lands under the command of Captain Bau-

* Voyage à la Martinique, 1763, p. 84.
has published some curious details on the tanaampo, or ampo, of the Javanese. "The reddish and somewhat ferruginous clay," he says*, "which the inhabitants of Java are fond of eating occasionally, is spread on a plate of iron, and baked, after having been rolled into little cylinders in the form of the bark of cinnamon. In this state it takes the name of ampo, and is sold in the public markets. This clay has a peculiar taste, which is owing to the torrefaction; it is very absorbent, and adheres to the tongue, which it dries. In general it is only the Javanese women who eat the ampo, either in the time of their pregnancy, or in order to grow thin; the want of plumpness being a kind of beauty in this country. The use of this earth is fatal to health; the women lose their appetite imperceptibly, and no longer take without disgust a very small quantity of food; but the desire of becoming lean, and of preserving a slender shape, can brave these dangers, and maintains the credit of the ampo." The savage inhabitants of New Caledonia also, to appease their hunger in times of scarcity, eat great pieces of a friable lapis ollaris†. Mr. Vauquelin analysed this stone, and found in it,

* Letter from Mr. Leschenault to Mr. de Humboldt on the Kind of Earth which is eaten at Java. (See Tableaux de la Nature, vol. i, p. 209.)

† Labillardière, vol. ii, p. 205.
beside magnesia and silex in equal portions, a small quantity of oxid of copper. Mr Goldberry had seen the Negroes in Africa, in the islands of Bunck and Los Idolos, eat an earth of which he had himself eaten, without being incommoded by it, and which also was a white and friable steatite*. In looking over these examples, which are all taken from the torrid zone, we are struck by the idea of finding a taste, which nature it would seem should have reserved for the inhabitants of the most steril regions, prevail among races of rude and indolent men, who live in the finest and most fertile countries on the globe. We saw at Popayan, and in several mountainous parts of Peru, lime reduced to a very fine powder, sold in the public markets to the natives among other articles of provision. This powder, when used, is mingled with coca, that is, with the leaves of the erythroxylon peru-vianum. It is well known, that Indian messengers take no other aliment for whole days than lime and coca; both excite the secretion of spittle, and of the gastric juice; they take away the appetite, without giving any nourishment to the body. In other parts of South America, on the coast of Rio de la Hacha, the Guajiroes swallow lime alone, without adding any vegetable matter to it. They always carry with them

a little box filled with lime, as we do snuff-boxes, and as in Asia people carry a betel box. This American custom excited the curiosity of the first Spanish navigators*. Lime blackens the teeth; and in the Indian Archipelago, as among several American hordes, to blacken the teeth is to beautify them. In the cold regions of the kingdom of Quito, the natives of Tigua eat habitually from choice, and without being incommoded by it, a very fine clay, mixed with quartzose sand. This clay, suspended in water, renders it milky. We find in their huts large vessels filled with this water, which serves as a beverage, and which the Indians call agua or leche de llanka†.

When we reflect on the whole of these facts, we perceive, that this disorderly appetite for clayey, magnesian, and calcareous earth, is most common among the people of the torrid zone; that it is not always a cause of disease; and that some tribes eat earth from choice, while others (the Otomacs in America, and the inhabitants of New Caledonia, in the Pacific Ocean,) eat it from want, and to appease hunger. A great number of physiological phenomena prove, that a temporary cessation of hunger may be produced, without the substances that are sub-

† Milk of clay. Llanka is a word of the general language of the Incas, signifying fine clay.
mitted to the organs of digestion being, properly speaking, nutritive. The earth of the Otomacs, composed of alumen and silex, furnishes probably nothing, or almost nothing, to the composition of the organs of man. These organs contain lime and magnesia in the bones, in the lymph of the thoracic duct, in the colouring matter of the blood, and in white hairs; they afford very small quantities of silex in black hair; and, according to Mr. Vauquelin, but a few atoms of alumin in the bones, though this is contained abundantly in the greater part of those vegetable matters, which form part of our nourishment. It is not the same with man as with animated beings placed lower in the scale of organization. In the former, assimilation is exerted only on those substances, that enter essentially into the composition of the bones, the muscles, and the medullary matter of the nerves and the brain. Plants, on the contrary, draw from the soil the salts that are found accidentally mixed in it; and their fibrous texture varies according to the nature of the earths, that predominate in the spots which they inhabit. An object well worthy of research, and which has long fixed my attention*, is the small number of simple substances (earthy and metallic),

* Aphor. ex Physiologia chimica Plantarum, in my Flora Freib. subterranea, p. 42.
that enter into the composition of animated beings, and which alone appear fitted to maintain what we may call the chemical movement of vitality.

We must not confound the sensations of hunger with that vague feeling of debility, which is produced by want of nutrition, and by other pathologic causes. The sensation of hunger ceases long before digestion takes place, or the chyme is converted into chyle. It ceases either by a nervous and tonic impression exerted by the aliments on the coats of the stomach; or because the digestive apparatus is filled with substances, that excite the mucous membranes to an abundant secretion of the gastric juice. To this tonic impression on the nerves of the stomach the prompt and salutary effects of what are called nutritive medicaments may be attributed, such as chocolate*, and every substance that gently stimulates and nourishes at the same time. It is the absence of a nervous stimulant, that renders the solitary use of a nutritive substance (of starch, gum, or sugar,) less favourable to assimilation, and to the reparation of the losses, which the human body undergoes. Opium, which is not nutritive, is employed with

success in Asia, in times of great scarcity: it acts as a tonic. But when the matter, which fills the stomach, can be regarded neither as an aliment, that is, as proper to be assimilated, nor as a tonic stimulating the nerves, the cessation of hunger is probably owing only to the secretion of the gastric juice. We here touch upon a problem of physiology, which has not been sufficiently investigated. Hunger is appeased, the painful feeling of inanition ceases, when the stomach is filled. It is said, that this viscus stands in need of ballast; and every language furnishes figurative expressions, which convey the idea, that a mechanical distention of the stomach causes an agreeable sensation. Very recent works of physiology still speak of the painful contraction, which the stomach experiences during hunger, the friction of it's sides against one another, and the action of the acid gastric juice on the texture of the digestive apparatus. The observations of Bichat, and more particularly the fine experiments of Mr. Magendie, are in contradiction to these superannuated hypotheses. After twenty-four, forty-eight, or even sixty hours of abstinence, no contraction of the stomach is observed; it is only on the fourth or fifth day, that this organ appears to change in a small degree it's dimensions. The quantity of the gastric juice diminishes with the duration of abstinence. It is probable, that this
juice, far from accumulating, is digested as an alimentary substance. If a cat or dog be made to swallow a substance, which is not susceptible of being digested, a pebble for instance, a mucous and acid liquid is formed abundantly in the cavity of the stomach, somewhat resembling by it's composition the gastric juice of the human body*. It appears to me very probable, according to the analogy of these facts, that, when the want of aliments compels the Otomacs and the inhabitants of New Caledonia to swallow clay and steatite during a part of the year, these earths occasion a powerful secretion of the gastric and pancreatic juices in the digesting apparatus of these people. The observations, which I made on the banks of the Oroonoko, have been recently confirmed by the direct experiments of two distinguished young physiologists, Messrs. Hippolyte Cloquet, and Breschet. After long fasting, they ate as much as five ounces of a silvery green and very flexible laminar talc. Their hunger was completely satisfied, and they felt no inconvenience from a kind of food, to which their organs were unaccustomed. It is known, that great use is still made in the East of the bolar and sigillated earths of Lemnos, which are clay mingled with oxid of iron. In Germany, the workmen em-

ployed in the quarries of sandstone worked at the mountain of Kiffhæuser spread a very fine clay upon their bread, instead of butter, which they call steinbutter*, stone butter; and they find it singularly filling, and easy of digestion†.

When in consequence of the changes, that are now preparing in the system of the Spanish colonies, the missions of the Oroonoko shall become more frequented by enlightened travellers, the number of days will be determined with precision, during which the Otomacs can subsist without adding to the clay they swallow any other aliment from the vegetable or animal kingdom. A considerable portion of gastric and pancreatic juice must be employed, to digest, or rather to envelope and expel with the fecal matter, so great a quantity of clay. We may conceive, that the secretion of these juices fit to enter into the mass of the chyle is augmented by the presence of earths in the stomach and intestines; but how does it happen, that such abundant secretions, which, far from furnishing the body with new matter, only produce the removal of substances already acquired by other means, do not cause at length a feeling of

* This steinbutter must not be confounded with the mountain butter, bergbutter, which is a saline substance, owing to a decomposition of aluminous schists.

exhaustion? The state of perfect health enjoyed by the Otomacs during the time when they use little muscular exercise, and are subjected to so extraordinary a regimen, is a phenomenon difficult to be explained. It can be attributed only to a habit, prolonged from generation to generation. The structure of the digestive apparatus differs much in animals, that feed exclusively on flesh or on seeds; it is even probable, that the gastric juice changes it's nature, according as it is employed in effecting the digestion of animal or vegetable substances; yet we are able gradually to change the regimen of herbivorous and carnivorous animals, to feed the former with flesh, and the latter with vegetables. Man can accustom himself to an extraordinary abstinence, and find it but little painful, if he employ tonic or stimulating substances (various drugs, small quantities of opium, betel, tobacco, leaves of coca); or if he supply his stomach from time to time with earthy, insipid substances, that are not in themselves fit for nutrition. Like man in a savage state, some animals also, when pressed by hunger in winter, swallow clay or friable steatites; such are the wolves in the north-east of Europe, the reindeer, and, according to the testimony of Mr. Patrin, the kids in Siberia. The Russian hunters on the banks of the Jenisey and the Amour use a clayey matter, which they call rock butter,
as a bait. The animals scent this clay from afar; and are fond of the smell, as the clays of bucaros, known in Portugal and Spain by the name of odoriferous earths (tierras olorosas), have an odour agreeable to women*. Brown relates, in his History of Jamaica, that the crocodiles of South America swallow small stones, and pieces of very hard wood, when the lakes which they inhabit are dry, or when they are in want of food. Mr. Bonpland and I observed in a crocodile, eleven feet long, which we dissected at Batalley, on the banks of the Rio Magdalena, that the stomach of this reptile contained fish half digested, and rounded fragments of granite three or four inches in diameter. It is difficult to admit, that the crocodiles swallow these stony masses accidentally, for they do not catch fish with their lower jaw resting on the ground at the bottom of the river. The Indians have framed the absurd hypothesis, that these indolent animals like to augment their weight, that they may have less trouble in diving. I rather think, that they load their stomach with large pebbles, to excite an abundant secretion of gastric juice. The experiments of Mr. Magendie

* Bucaro, vas fictile odoriferum. People are fond of drinking out of these vessels on account of the smell of the clay. The women of the province of Alentejo acquire a habit of chewing the bucaro earth; and feel a great privation, when they cannot indulge this vitiated taste.
render this explanation extremely probable. With respect to the habit of the granivorous birds, particularly the gallinaceæ and ostriches, of swallowing sand and small pebbles, it has been hitherto attributed to an instinctive desire of accelerating the trituration of the aliments in a muscular and thick stomach.

We have seen above, that tribes of Negroes on the Gambia mingle clay with their rice; some families of Otomacs had perhaps formerly the custom of causing maize and other farinaceous seeds to rot in their poya, in order to eat earth and amylaceous matter together: perhaps it was a preparation of this kind, that father Gumilla described confusedly in the first volume of his work, when he affirms, "that the Guamoes and the Otomacs feed upon earth only because it is impregnated with the sustancia del maiz, and the fat of the cayman." I have already observed above, that neither the present missionary of Uruana, nor Fray Juan Gonzales, who lived long in those countries, knew any thing of this mixture of animal and vegetable substances with the poya. Perhaps father Gumilla has confounded the preparation of the earth, which the natives swallow, with the custom they still retain (of which Mr. Bonpland acquired the certainty on the spot) of burying in the ground the beans of a species of mimosaceæ*, to cause them

* Of the group of ingas.
to enter into decomposition, in order to reduce them into a white bread, savoury, but difficult of digestion. I repeat, that the balls of poya, which we drew from the winter stores of the Indians, contained no trace of animal fat, or of amylaceous matter. Gumilla being one of the most credulous travellers we know, it almost perplexes us to credit facts, which he has thought fit to reject. Fortunately, in the second volume of his work, he resumes a great part of what he advanced in the first; he no longer doubts, that "half at least (a lo menos) of the bread of the Otomaes and the Guamoes is clay." He asserts, "that children and full grown persons not only eat this bread without suffering in their health, but also great pieces of pure clay (muchos terrones de pura greda.)" He adds, that those who feel a weight on the stomach purge themselves with the fat of the crocodile, which restores their appetite, and enables them to continue to eat pure earth*. I doubt the manteca de caiman being a purgative; but, as it is very fluid, it may contribute to envelop the earth, which has not been expelled among the fecal matter. It is certain, that the Guamoes are very fond, if not of the fat, at least of the flesh of the crocodile, which appeared to us white, and without any smell of musk. In

Sennaar, according to Mr. Burckhardt, it is alike much esteemed, and sold in the markets.

I cannot silently pass over some questions, that have been agitated in different memoirs published on occasion of my voyage on the Oroonoko. Mr. Leschenault inquires, whether the ampo (the clay of Java) may not be useful in appeasing hunger occasionally, in circumstances when a person is destitute of food, or compelled to have recourse to substances unwholesome or hurtful, though derived from the organic kingdoms. I believe, that in experiments tried on the consequences of long abstinence, an animal forced to swallow clay (in the manner of the Otomacs) would suffer less than another animal, the stomach of which had received no aliment. An Italian physiologist *, struck with the small quantities of the phosphats of lime and magnesia, of silex, sulphur, soda, fluor, iron, and manganese; and the large quantities of carbon, oxygen, azot, and hydrogen, which are contained in the solid and liquid parts of the human body; inquires whether respiration may not be regarded as a continued act of nutrition, while the digestive apparatus is filled with clay. The chemical analysis of the air inhaled and the air expired does not favour this hypothesis. It

is difficult to ascertain the loss of a very small quantity of azot, and it may be admitted, that in general the functions of respiration are confined to the removal of carbon and hydrogen from the body.

A moistened mixture of phosphat and carbonat of lime, cannot be nourishing like substances equally destitute of azot, (such as sugar, gum, starch,) but drawn from the organic kingdom. Our digestive apparatus is like a galvanic pile, which decomposes only certain substances. The assimilation ceases, not solely because the matter, which the stomach receives, does not contain aliments similar to those, which compose the human body; but also because the digestive power, that of chemical decomposition, does not extend indifferently to all combinations. We can scarcely dwell on these speculations of general physiology, without inquiring what would have been the state of society, or rather of the human race, if man had no need of the productions of organization and vitality as aliment. No habit can essentially change the mode of nutrition. We shall never learn to digest and assimilate earth: but since the grand experiments of Gay-Lussac and Thenard have made known to us, that only slight differences in the proportions of oxygen, hydrogen, and carbon, distinguish the hardest wood from the substance
of starch *, how can we deny, that chemistry may one day succeed in converting those enormous vegetable masses, those textures of hardened fibres, that compose the trunks of the trees of our forests, into alimentary substances? Such a discovery, to be important, must be founded on cheap and simple processes: but in this supposition, which appears scarcely probable, it would change the organization of political bodies, the price of labour, and the actual distribution of the population of the Globe. In rendering man more independant, it would tend to dissolve the bonds of society, and to sap the foundations of industry and civilization.

The little village of Uruana is more difficult to govern, than the greater part of the other missions. The Otomacs are a restless, turbulent people, with unbridled passions. They are not only fond to excess of the fermented liquors from

* Starch. Oak timber.
Oxygen........49·68 41·78
Carbon........43·55 52·53
Hydrogen......6·77 5·69

100·00 100·00

The unwholesome bread of the Laplanders, called birch-bread and pine bread, is made from the alburnum of trees; but they have lately succeeded in making cakes somewhat nutritive, with a mixture of wheaten flour and rasped wood of the oak.
cassava and maize, and of palm wine, but they throw themselves into a peculiar state of intoxication, we might almost say of madness, by the use of the powder of *niopo*. They gather the long pods of a mimosacea, which we have made known by the name of *acacia niopo* †, cut them into pieces, moisten them, and cause them to ferment. When the softened seeds begin to grow black, they are kneaded like a paste, mixed with some flour of cassava and lime procured from the shell of a helix, and the whole mass is exposed to a very brisk fire, on a grate of hard wood. The hardened paste takes the form of small cakes. When it is to be used, it is reduced to a fine powder, and placed on a dish five or six inches wide. The Otomac holds this dish, which has a handle, in his right hand, while he inhales the *niopo* by the nose, through a forked bone of a bird, the two extremities of which are applied to the nostrils. This bone, without

* In Maypure, *nupa*; the missionaries say Ńopo.
† It is an acacia with very delicate leaves, and not an inga, as Mr. Willdenow has said by mistake. (Spec. Plant., vol. iv, pl. 2, p. 1027.) We brought home another species of mimosacea (the chiga of the Otomacs, and the sepa of the Maypures), that yields seeds, the flour of which is eaten at Uruana like cassava. From this flour the chiga bread is prepared, which is so common at Cumarihe, and on the banks of the Lower Oroonoko. The chiga is a species of inga, and I know of no other mimosacea, that can supply the place of the cerealia.
which the Otomac believes that he could not take this kind of snuff, is seven inches long: it appeared to me to be the leg bone of a large sort of plover (échassier). I sent the niopo, and all this singular apparatus, to Mr. de Fourcroy at Paris. The niopo is so stimulating, that the smallest portions of it produce a violent sneezing in those, who are not accustomed to it's use. Father Gumilla says*, "This diabolical powder of the Otomacs, furnished by an arborescent tobacco-plant, intoxicates them by the nostrils (embroracha por las narices), deprives them of reason for some hours, and renders them furious in battle." However varied may be the family of the leguminous plants in the chemical and medical properties of their seeds, juices, and roots, we cannot believe, from what we know hitherto of the group of mimosacæ, that it is principally the pod of the acacia niopo, that imparts the stimulant power to the snuff of the Otomacs. This power is owing, no doubt, to the lime freshly calcined. We have shown above, that the mountaineers of the Andes of Popayan, and the Guajiroes who wander between the lake of Maracaybo and the Rio la Hacha, are also fond of swallowing lime as a stimulant, to augment the secretion of the spittle and the gastric juice.

In sending to Europe the complicated apparatus, which the Otomacs employ in order to inhale the powder of *niopo*, I directed the attention of the learned to an analogous custom, which Mr. de la Condamine observed among the natives of the Upper Maragnon. The Omaguas, whose name is rendered celebrated by the expeditions attempted in search of Dorado, have the same dish, and the same hollow bone of a bird, by which they convey to their nostrils their powder of *curupa*. The seed that yields this powder is no doubt also a mimosacea; for the Otomacs, according to Father Gili, denote even now, at the distance of one hundred and sixty leagues from the Amazon, the *acacia niopo* by the name of *curupa*. Since the geographical researches, which I have recently made on the theatre of the exploits of Philip von Huten, and on the real situation of the province of Papamene †, or of the Omaguas, the probability of an ancient communication between the Otomacs of the Oroonoko and the Omaguas of the Maragnon has become more interesting and more probable. The former came from the Meta, perhaps from the country between the Meta and the Guaviare; the latter assert, that they descended


† See above, p. 319, 323, 340.
in great numbers * to the Maragnon by the Rio Japura, coming from the eastern declivity of the Andes of New Grenada. Now, it is precisely between the Guayavero, which joins the Guaviare, and the Caqueta, which takes lower down the name of Japura, that the country of the Omagua appears to be situate, of which the adventurers of Coro and Tocuyo in vain attempted the conquest. There is no doubt a striking contrast between the present barbarism of the Otomaes, and the ancient civilization of the Omaguas; but all parts of the latter nation were not perhaps alike advanced in civilization, and the example of tribes fallen into complete barbarism are unhappily but too common in the history of our species. Another point of resemblance may be remarked between the Otomaes and the Omaguas. Both of these nations are celebrated among all the tribes of the Oroonoko and the Amazon for the frequent use which they make of caoutchouc, or the inspissated milk of the euphorbiaceae and the urticeae.

* I do not admit, with Mr. de la Condamine, that the whole nation of the Omaguas came from the north. (See the learned researches of Mr. Vater on the ancient seats of that powerful people, tolerably advanced in civilization, in Mithridates, vol. iii, pl. 1, p. 598.) The Om-aguas or En-aguas called themselves also Aguas (Acanha, p. 24). For this reason, no doubt, the province of Pampamene, or of the Omaguas, bore the name of Dit-Agua. (Fray Pedro Simón, p. 340.)
The real herbaceous tobacco* (for the missionaries have the habit of calling the *niopo or cu-
rupa tree-tobacco) has been cultivated from time immemorial by all the native people of the Oroonoko; and at the period of the conquest, the habit of smoking was found to be alike spread over both Americas. The Tamanacs and the Maypures of Guyana wrap maize leaves round their cigars, as the Mexicans did at the arrival of Cortes. The Spaniards have substituted paper for the leaves of maize, in imitation of them. The poor Indians of the forests of the Oroonoko know as well as did the great nobles at the court of Montezuma, that the smoke of tobacco is an

* The word tobacco (tabacco), like the words savannah, maize, cacique, maguey (agave), and manatee, belongs to the ancient language of Haiti, or Saint Domingo. It did not properly denote the herb, but the tube, the instrument through which the smoke was inhaled. It seems surprising, that a vegetable production so universally spread should have different names among neighbouring people. The pete-ma of the Omaguas is, no doubt, the pety of the Guaranies; but the analogy between the Cabre and Algonkin, or Lenni-Lenape, words, which denote tobacco, may be merely accidental. The following are the synonymes in thirteen languages.

North-America. Azteck, or Mexican; yetl: Algonkin; sema: Huron; oyngoua.

South-America. Peruvian or quchua; sayri: Chiquito; pdis: Guarany; pety: Vilela; tusup: Mbaja, west of the Paraguay, naldagadi: Moxo between the Rio Ucayalis and the Rio Madeira; saburc: Omagua; petema: Tamanac; cavai: Maypure; jema: Cabre; scema.
excellent narcotic; and they use it not only in order to procure their afternoon nap, but also to put themselves into that state of quietism, which they call with great simplicity *dreaming with the eyes open*, or a *day dream*. The use of tobacco appeared to me to be now very rare in the missions; and in New Spain, to the great regret of the revenue officers, the natives, who almost all descend from the lowest class of the Azteck people*, do not smoke at all. Father Gili † affirms, that the practice of chewing tobacco is unknown to the Indians of the Lower Oroonoko. I doubt a little the truth of this assertion, having been told, that the Sercucumas of the Erevato and the Caura, neighbours of the whitish Taparitoes, swallow tobacco chopped small, and impregnated with some other very stimulant juices, to prepare themselves for battle. Of the four species of nicotiana cultivated in Europe (n. tabacum, n. rustica, n. paniculata, and n. glutinosa,) we found only the two latter growing wild; but the nicotiana loxensis, and the n. andicola, which I found on the bank of the Andes, at 1850 toises of elevation, almost the height of the Peak of Teneriffe, are very similar to the n. tabacum and n. rustica ‡. The whole genus however is

* See my *Essai pol.*, vol. ii, p. 455.
† Vol. iii, p. 407.
almost exclusively American, and the greater number of the species appeared to me to belong to the mountainous and temperate region of the tropics.

It is neither from Virginia, nor from South America, as it is said erroneously in several agricultural and botanical works, but from the Mexican province of Yucatan, that Europe received the first tobacco seeds, about the year 1559*. The man who has boasted most of the fecundity of the banks of the Oronoko, the celebrated Raleigh, contributed most also to introduce the custom of smoking among the nations of the north. Already, at the end of the 16th century, bitter complaints were made in England "of this imitation of the manners of a savage people." It was feared, that by the practice of smoking tobacco Anglorum corpora in barbarorum naturam degenerent†.

* The Spaniards became acquainted with tobacco in the West India islands at the end of the 15th century. I have remarked above (vol. iii, p. 62.), that the cultivation of this narcotic plant preceded the beneficent cultivation of the potato in Europe more than 120 or 140 years. When Raleigh brought tobacco from Virginia to England in 1586, whole fields of it were already cultivated in Portugal.

† This remarkable passage of Camden is as follows, Annu. Elizabet., p. 143 (1585); "ex illo sane tempore (tobac- cum) usu cepit esse creberrimo in Anglia et magno preti- dum quam plurimi graveolentem illius fumum per tubulum testaceum hauriunt et mox o' naribus efflant, adeo ut Anglo-
When the Otomacs of Uruana by the use of niopo (of their arborescent tobacco), and of fermented liquors, have thrown themselves into a state of intoxication, which lasts several days, they kill one another without ostensibly fighting. The most vindictive among them poison the nail of their thumb with curare; and, according to the testimony of the missionary, the mere impression of this poisoned nail may become mortal, if the curare be very active, and immediately mingle with the mass of the blood. When the Indians, after a quarrel at night, commit a murder, they throw the dead body into the river, fearing that some manifest indications of the violence exercised on the deceased might be observed. "Every time," said father Bueno, "that I see the women fetch water from a part of the shore, to which they are not accustomed to go for it, I suspect, that a murder has been committed in my mission."

We found in the Indian huts at Uruana the same vegetable substance (touchwood of ants*),

rum corpora in barbarorum naturam degenerasse videantur, quum idem ac barbari delectentur." We may see from this passage, that they emitted the smoke through the nose; but at the court of Montezuma the pipe was held in one hand, while the nostrils were stopped with the other, in order that the smoke might be more easily swallowed. Life of Raleigh, vol. i, p. 82.

* Yesca de hormigas.
with which we had become acquainted at the Great Cataracts, and which is employed to stop bleeding. This touchwood, which might less improperly be called *ants' nests*, is much sought for in a region, the character of the inhabitants of which is so little pacific. A new species of ant, of a fine emerald green (*formica spinicollis*), collects for it's habitation a cotton down, of a yellowish brown colour, and very soft to the touch, from the leaves of a *melastomaceae*. I have no doubt, that the *yesca* or *touchwood of ants* of the Upper Oroonoko (the animal is found, we were assured, only South of Atures) will one day become an article of trade. This substance is very superior to the *ants' nests* of Cayenne, which are employed in the hospitals of Europe, but can rarely be procured.

On the 7th of June we quitted with regret father Ramon Bueno. Among the ten missionaries, whom we had found in different parts of the vast extent of Guyana, he alone appeared to me to be attentive to all that regarded the natives. He hoped to return in a short time to Madrid, where he intended to publish the result

* Puji in Guaraken; madi in Equinabi. See the note which I added to the description of the *formica spinicollis* given by Mr. Latreille, in my *Obs. de Zoologie*, vol. ii, p. 101, Pl. xxxviii, fig. 6.

† The leaves of the *guari* tree, are covered on the lower surface with a reddish down.
of his researches on the figures and characters that cover the rocks of Uruana. It was in the countries we had just passed through, between the Meta, the Arauca, and the Apure, that, at the time of the first expeditions to the Oroonoko, for instance that of Alonzo de Herera, in 1535, mute dogs were found, called by the natives maios, and auries*. This fact is curious in many points of view. We cannot doubt that the dog, whatever father Gili may assert, is indigenous in South America. The different Indian languages furnish words to designate this animal, which are scarcely derived from any European tongue. To this day the word auri, mentioned three hundred years ago by Alonzo de Herera, is found in the Maypure†. The dogs we saw at the Oroonoko may perhaps have descended from those, that the Spaniards carried to the coast of Caraccas; but it is not less certain, that there existed a race of dogs before the conquest in Peru, in New Grenada, and in Guyana, resembling our shepherds' dogs. The allco of the natives of Peru, and in general all the dogs that we found in the wildest countries of South America, bark frequently. The first historians however all speak of mute dogs (perros mudos); they still exist in Canada; and, what appears to

† Gili, vol ii, p. 378.
me worthy of attention, it was this dumb variety that was eaten in preference in Mexico*, and at the Oroonoko. A very well informed traveller, Mr. Giesecke, who resided six years in Greenland, assured me, that the dogs of the Eskimoes, which pass their lives in the open air, and bury themselves in winter beneath the snow, equally do not bark, but howl like wolves†.

The practice of eating the flesh of dogs is now entirely unknown on the banks of the Oroonoko; but, as it is a Tatar custom spread through all the eastern part of Asia, it appears to me highly interesting for the history of nations, to have ascertained, that it existed heretofore in the hot regions of Guyana, and on the table-lands of Mexico. I must observe also, that on the confines of the province of Durango, at the northern extremity of New Spain, the Cumanches have preserved the habit of loading the backs of the great dogs, that accompany them in their migra-

* See on the Mexican techichi, and on the numerous difficulties, that occur in the history of mute dogs, and dogs destitute of hair, my Tableaux de la Nature, vol. i, p. 117-124.
† They sit down in a circle; one of them begins to howl alone, and the others follow in the same tone. The groupes of alouate monkeys howl in the same manner, and among them the Indians distinguish “the leader of the band.” See above, vol. iv, p. 267. It was the practice at Mexico to castrate the mute dogs, in order to fatten them. This operation must have contributed to alter the organ of the voice. See Antiqued. del Mex. por el Cardinal Lorenzana, p. 108.
tions*, with their tents of buffalo leather. It is well known, that employing dogs as beasts of burden and of draught is equally common near the Slave Lake, and in Siberia. I dwell on these features of conformity in the manners of nations, which become of some weight, when they are far from solitary, and are connected with the analogies furnished by the structure of languages, the division of time, and religious creeds and institutions.

We passed the night at the island of Cucuruparuf, called also Playa de la Tortuga, because the Indians of Uruana go thither to collect the turtles' eggs. It is one of the best determined points of latitude along the banks of the Oroonoko. I was there fortunate enough to observe the passage of three stars over the meridian‡.

* See the Journal of the Tour of Bishop Tamaron, vol. 7 (manuscript), and my Essai polit., vol. i, p. 290.
† Gili (vol. i, p. 99) writes Curucuruparu.
‡ See vol. iv, p. 479. I found by α of the Southern Cross 7° 15' 30"; by α of the Centaur, 7° 15' 43"; by β of the Centaur, 7° 15' 42". I consider as doubtful, on my itinerary map, Pl. 16, the situation of the mouth of the Cano de la Tortuga. As the Oroonoko has the immense breadth of two thousand toises, and the boats do not descend along the same bank by which they go up, it is difficult to make the bearings tally. Between Caycara and the Great Cataracts I determined astronomically San Rafael del Capuchino, the mouth of the Apure, the island of Cucuruparu, the mission of Uruana, and Atures. I could determine only the longitude of

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To the east of the island is the mouth of the Cano de la Tortuga, which descends from the mountains of Cerbatana, continually wrapped in electric clouds. On the southern bank of the Cano, between the tributary streams Parapara and Oche, lies the almost ruined mission of San Miguel de la Tortuga. The Indians assured us, that the environs of this little mission abound in otters with a very fine fur, called by the Portugueze water dogs*; and, what is still more remarkable, in lizards (lagartos) with two feet. The whole of this country, very accessible between the Rio Cuchivero and the strait of Baraguan, is worthy of being visited by a well-informed zoologist. The lagarto, destitute of hinder extremities, is perhaps a species of syren, different from the siren lacertina of Carolina. If it were a saurien, a real bimanis (chirotes, Cuv.), the natives would not have compared it to a lizard. Beside the arau turtles, of which I have given above a detailed account, an innumerable quantity of land tortoises also, called morocoi, are found on the banks of the Oroonoko, between Uruana and Encaramada. During the mouth of the Meta; and, to improve the geography of the Oroonoko, I recommend to travellers furnished with accurate instruments, to ascertain the latitude of la Boca de Meta, Carichana, and Encaramada.

* Perritos de agua; in Maypure nevi.
† Vol. iv, p. 475-495.
the great heats of summer, in the time of drought, these animals remain hidden, without taking food, beneath stones, or in the holes which they have dug. They issue from their shelter, and begin to eat, only when they perceive the humidity of the first rains penetrate into the earth. The *terekays*, or *tajelus*, turtles that live in fresh water, have the same habits*. I have already spoken of the *summer sleep* of some animals of the tropics†. As the natives know the holes in which the tortoises sleep amid the dried lands, they get out a great number at once, by digging fifteen or eighteen inches deep. Father Gili says, that this operation, which he had seen, is not without danger, because the serpents often bury themselves in summer with the *terekays*.

From the island of Cucuruparu, as far as the capital of Guyana, vulgarly called *Angostura*, we were but nine days on the water. The distance is a little less than ninety-five leagues. We seldom slept on shore; but the torment of the moschettoes diminished sensibly in proportion as we advanced. We landed on the 8th of June at a farm (*hato de San Rafael del Capuchino*), opposite the mouth of the Rio Apure. I obtained some good observations of latitude and longi-

† See above, vol iv, p. 380, 381; and my *Tableaux de la Nature*, vol. i, p. 50 and 183.
tude*. Having two months before taken horary angles on the bank opposite *Capuchino*, these observations were important for determining the rate of my chronometer, and connecting the situations on the Oroonoko with those on the shore of Venezuela. The situation of this farm, being at the point where the Oroonoko changes its course, which was from south to north, and hence runs from west to east, is extremely picturesque. Granitic rocks† rise like islets amid vast meadows. From their tops we discerned toward the north the Llanos or steppes of Calabozo bounding the horizon. Long accustomed to the aspect of forests, this view powerfully struck the imagination. The steppes after sunset assume a tint of greenish gray. The visual ray being intercepted only by the rotundity of the Earth, the stars seemed to rise as from the bosom of the ocean, and the most experienced

* I had found, April the 4th, for the Boca del Río Apure (on the western bank of the Oroonoko), the lat. 7° 36' 30"; the longitude 69° 7' 30"; June the 8th, I found, for the Hato del Capuchino (on the eastern bank of the Oroonoko), the lat. 7° 37' 45"; the long. 69° 5' 30''. See my *Obs. Astr.* vol. i, p. 244.

† They are Punto Curiquima, Cerro del Capuchino, or Pocopocorí, Cerro Sacuima, and Pan de Azucar, de Caycara, on the right bank of the Oroonoko; Loma de Cabruta, Cerro Aguaro, and Coruato (the refuge of Indian malefactors, who have deserted from the neighbouring missions), on the left bank of the Oroonoko.
The mariner would have fancied himself placed on a projecting cape of a rocky coast. Our host was a Frenchman*, who lived amid his numerous herds. Though he had forgotten his native language, he seemed pleased to learn, that we came from his country, which he had left forty years before; and he wished to retain us for some days at his farm. The political revolutions of Europe were to him almost unknown. He saw only a movement against the clergy and the monks; and observed, that "this movement would last as long as the monks continued to make resistance." This manner of seeing was very natural for a man, who had passed his life on the borders of the missions, and who had heard unceasingly of the conflict between the secular and ecclesiastical powers. The small towns of Caycara and Cabruta were only a few miles distant from the farm; but during part of the year our host was in complete solitude. The Capuchino becomes an island by the inundations of the Apure and the Oroonoko, and the communication with the neighbouring farms can be kept up only by means of a boat†.

* M. François Doizan.
† To the south west are Hato del Re, and Hato de San Antonio. From Uruana as far as the mouth of the Cuchivero, the vegetation of these countries appeared to us to be characterized in the savannahs by isolepis squarrosa, i. vahlii, i. gracilis, oplismenus Burmanni; and in woody places by the
horned cattle then seek the higher grounds, that extend on the south toward the chain of the mountains of Encaramada. This granitic chain is intersected by vallies, which contain magnetic sands (granulary oxidulated iron), owing no doubt to the decomposition of some amphibolic or chloritic strata.

On the morning of the 9th of June we met a great number of boats laden with merchandize, sailing up the Oroonoko, in order to enter the Apure. This is a commercial road much frequented between Angostura and the port of Torunos in the province of Varinas. Our fellow traveller, Don Nicolas Soto, brother in law to the governor of Varinas, took the same course, to return to his family. At the period of the high waters, several months are lost in striving against the currents of the Oroonoko, the Apure, and the Rio de Santo Domingo. The boatmen are forced to carry out ropes to the trunks of trees, and thus warp their canoes up. In the great sinuosities of the river whole days are sometimes passed without advancing more than two

beautiful apoiba or aubletia tibrbu, plumeria mollis, allamanda cathartica, echites macrophylla, bignonia salicifolia, b. carichancensis, b. verrucosa, sabicea hirsuta, piper anisatum, and rubia orinocensis. We were surprised to find this latter plant, which belongs to the almost northern group of the stellatae, among the rubiaceae of the low regions of the tropics. (Brown, on the Plants of the Congo, p. 28.)
or three hundred toises. Since my return to Europe, the communications between the mouth of the Oroonoko and the provinces situate on the eastern slope of the mountains of Merida, Pamplona, and Santa Fe de Bogota, are become more active; and it may be hoped, that steamboats will facilitate these long voyages on the Lower Oroonoko, the Portuguesa, the Rio Santo Domingo, the Orivante, the Meta, and the Guaviare. Magazines of cleft wood might be formed, as on the banks of the great rivers of the United States, sheltering them under sheds. This precaution would be indispensable, as, in the country through which we passed, it is not easy to procure dry fuel fit to keep up a brisk fire beneath the boiler of a steam engine.

We disembarked below San Rafael del Capuchino, on the right, at the Villa de Caycara, near a cove called Puerto Sedeno. It is a collection of a small number of houses, that bears the pompous name of villa. Alta Gracia, la Ciudad de la Piedra, Real Corona, Borbon, all the towns that lie between the mouth of the Apure and Angostura, are equally miserable. I mentioned above, that the presidents of the missions, and the governors of the provinces, had formerly the habit of demanding the privileges of villas and ciudades at Madrid, the moment the first foundations of a church were laid. This was a means of persuading the ministry, that the colo-
nies augmented rapidly in population and prosperity. Sculptured figures of the Sun and Moon, such as I have already mentioned, are found near Caycara, at the Cerro del Tirano*. It is "the work of the old people" (that is of our fathers), say the natives. On a rock more distant from the shore, and called Tecoma, the symbolic figures are found, it is said, at the height of a hundred feet. The Indians knew heretofore a road, that led by land from Caycara to Demerary and Essequebo. Did the tribes, that sculptured the figures† described by the traveller Hortsmann, come by this same road to the lake Amucu?

On the northern bank of the Oroonoko, opposite Caycara, is the mission of Cabruta, founded by the jesuit Rotella, in 1740, as an advanced post against the Caribbees. An Indian village,

* The tyrant who gave this name to these mountains is not Lope de Aguirre, but probably, as the name of the neighbouring cove seems to prove, the celebrated conquistador Antonio Sedeno; who, after the expedition of Herera, sought to penetrate by the Oroonoko to the Rio Meta. He was in a state of rebellion against the audiencia of Saint Domingo. I am ignorant however how Sedeno came to Caycara; for historians relate, that he was poisoned on the banks of the Rio Tisnado, one of the tributary streams of the Portuguesa. (Frey Pedro Simon, Not. 4, cap. 21, No. 3, p. 303. Caulin, p. 158).

† See above, p. 593.
known by the name of Cabritu*, had existed on the same spot for several ages. At the time when this little place became a Christian settlement, it was believed to be situate in the latitude of five degrees†, or two degrees forty minutes more to the south than I found it by direct observations made at San Rafael, and at la Boca del Rio Apure. No idea was then conceived of the direction of a road, that could lead by land to Nueva Valencia and Caraccas, which were supposed to be at an immense distance. The merit of having first crossed the Llanos, to get from the Villa de San Juan Baptista del Pao to Cabruta, belongs to a woman. Father Gili‡ relates, that Donna Maria Bargas was so passionately fond of the Jesuits, that she attempted herself to discover the way to the missions. She was seen with astonishment to arrive at Cabruta from the north. She took up her abode near the fathers of Saint Ignatius, and died in their settlements on the banks of the Oroonoko.

* A cacique of Cabritu received Alonso de Herera at his dwelling, on the expedition he attempted for going up the Oroonoko, in 1535.

† See the maps of Gumilla and Caulin. D’Anville ended by guessing better the latitude of Cabruta; which he places in the first edition of his South America at 5° 22’, but in the second at 7° 2’. The new map of Arrowsmith indicates this important point by the name of Carula.

‡ Vol. i, p. 51.
Since that period, the southern part of the Llanos has been considerably peopled; and the road, that leads from the valleys of Aragua by Calabozo to San Fernando de Apure and Cabruta, is much frequented. The chief of the famous expedition of the boundaries made choice of the latter place in 1754, to establish yards for building the vessels necessary for conveying his troops intended for the Upper Oroonoko. The little mountain, that rises north-east of Cabruta, can be discerned from afar in the steppes, and serves as a landmark for travellers.

We embarked in the morning at Caycara; and driving with the current of the Oroonoko, we first passed the mouth of the Rio Cuchivero, where an ancient tradition has placed the Ai-keam-benanos, or women without husbands; and we there reached the paltry village of Alta Gracia, which bears the name of a Spanish town. It was near this place, that Don Jose de Yturriaga founded the pueblo de Ciudad Real, which still figures on the most modern maps, though it has not existed for fifty years past, on account of the insalubrity of it's situation. After having passed the point where the Oroonoko turns to the east, forests are constantly seen on the right bank, and the Llanos or steppes of Venezuela on the left. The forests, which border the river,

* See above, p. 392.
are not however so thick as those of the Upper Oroonoko. The population augments perceptibly as you advance toward the capital: you find few Indians, but Whites, Negroes, and men of mixed descent. The number of the Negroes is not great; but here, as every where else, the poverty of their masters is far from procuring for them more humane treatment, and more favourable to their preservation. An inhabitant of Caycara, Mr. V—a, had just been condemned to four years imprisonment, and a fine of one hundred piastres, for having, in a paroxysm of rage, tied a Negress by the legs to the tail of his horse, and dragged her at full gallop through the savannah, till she expired of agony. I am glad to record, that the Audiencia was generally blamed in the country, for not having punished more severely so atrocious an action. Yet a small number of persons, who pretended to be the most enlightened and most sagacious of the community, deemed the punishment of a White contrary to sound policy, at the moment when the Blacks of Saint Domingo were in complete insurrection. When institutions that have become odious are menaced, men are never wanting, who, in order to maintain them, advise no relaxation of what they contain that is most hostile to reason and justice. Since I left those countries, civil dissensions have put arms into the hands of the slaves; and fatal experience
has led the inhabitants of Venezuela to regret, that they refused to listen to don Domingo Tovar, and other virtuous citizens, who, as early as the year 1795, lifted up their voices in the cabildo of Caraccas, to prevent the introduction of Blacks, and to propose means that might have meliorated their condition.

After having slept on the 10th of June in an island in the middle of the river, I believe that called Acaru by Father Caulin, we passed the mouth of the Rio Caura. This, the Aruy, and the Carony, are the largest tributary streams, that the Oroonoko receives on it's right bank. Having been able during my abode in the missions of Saint Francis, to collect many geographical materials respecting the Caura, I have traced a particular map of it*. All the Christian settlements are now found near the mouth of the river; and the villages of San Pedro, Aripao, Urbani, and Guaraguaraico, succeed each other at the distance of a few leagues. The first, which is the most populous, contains however but two hundred and fifty souls. That of San Luis de Guaraguaraico is a colony of Negroes, either freed or fugitives from Essequibo, which merits the particular attention of government. It can never be sufficiently recommended, to

*Atlas geogr., Pl. 20. See above, on the Rio Caura, p. 34, and 606.
endeavour to attach the slaves to the soil, and suffer them to enjoy as farmers the fruits of their agricultural labours. The land on the Caura, for the most part a virgin soil, is extremely fertile. There are pasturages for more than 15,000 beasts; but the poor inhabitants have neither horses nor horned cattle. More than six sevenths of the banks of the Caura are either desert, or occupied by independent and savage tribes. The bed of the river is twice choked up by rocks; occasioning the famous Raudales of Mura and of Para or Paru, the latter of which has a portage, because it cannot be passed by canoes. At the time of the expedition of the boundaries, a small fort was erected on the northern cataract, that of Mura. The governor, don Manuel Centurion, hastened to give the name of Ciudad de San Carlos to a few houses, which some Spanish families (that is to say, not Indians), consisting of Whites and Mulattoes, had constructed near the fort. South of the cataract of Para, at the confluence of the Caura and the Erevato, the mission of San Luis was then found; and a road by land led thence to Angostura, the capital of the province. All these attempts at civilization have been fruitless. No village any longer exists above the Raudal of Mura; and here, as in many other parts of the colonies, the natives have as we may say reconquered the country from the Spaniards.
The valley of Caura, however, may become one day or other highly interesting from the value of it's productions, and the communications which it furnishes with the Rio Ventuari, the Carony, and the Cuyuni. I have shown above the importance of the four tributary streams, which the Oroonoko receives from the mountains of Parima. Near the mouth of the Caura, between the villages of San Pedro de Alcantara and San Francisco de Aripao, a small lake of four hundred toises in diameter was formed in 1790, by the sinking in of the ground, in consequence of an earthquake*. It was a portion of the forest of Aripao, which sunk to the depth of eighty or a hundred feet below the level of the neighbouring land. The trees remained green for several months; and some of them, it was believed, continued to push forth leaves beneath the water. This phenomenon is the more worthy of attention, as the soil of these countries is probably granitic. I doubt the secondary formations of the Llanos being continued toward the south as far as the valley of Caura.

The 11th of June we landed on the right bank of the Oroonoko at Puerto de los Frailes†, at the

* On Saint Mathew's day, in 1790, at three o'clock in the morning.
† Opposite the granitic rock called Piedra de Don Ignacio, after the name of a famous smuggler, who roamed the country between the Essequebo and the Llanos of Caraccas.
distance of three leagues above the Ciudad de la Piedra, to take altitudes of the Sun. The longitude of this point is 67° 26' 20", or 1° 41' east of the mouth of the Apure. Farther on, between the towns of la Piedra and Muitaco, or Real Corona, occur the Torno and the Mouth of Hell, two obstacles, which were formerly dreaded by voyagers. The Oroonoko suddenly changes it's direction; it flows first to the east, then to the north-north-west, and then again to the east. A little above the Canno Marapiche, which opens on the northern bank, a very long island divides the river into two branches. We passed on the south of this island without difficulty; toward the north a chain of small rocks, half covered when the water is high, forms whirlpools and rapids. This is what is called la Boca del Infierno, and the Raudal de Camiseta. The first expeditions of Diego de Ordaz (1531) and Alonso de Herera (1535) have given celebrity to this bar. The Great Cataracts of the Atures and Maypures were then unknown; and the clumsy vessels (vergantines), in which travellers persisted in going up the river, rendered the passage through the rapids extremely difficult. At present no apprehension is felt in ascending or descending the Oroonoko, at any season, from it's mouth as far as the confluence of the Apure and the Meta. The only falls of water in this space are those of Torno or Camiseta, Marimara,
and Cariven, or Carichana Vieja *. Neither of these three obstacles is to be feared with experienced Indian pilots. I dwell on these hydrographic details, because a great political and commercial interest is now connected with the communications between Angostura and the banks of the Meta and the Apure, two rivers that lead to the eastern side of the Cordilleras of New Grenada. The navigation from the mouth of the Lower Oroonoko to the province of Varinas is difficult only on account of the force of the current. The bed of the river no where presents obstacles more difficult to vanquish, than those of the Danube between Vienna and Lintz. We meet with no great bars, no real cataracts, but above the Meta. The Upper Oroonoko therefore, with the Cassiquiare and the Rio Negro, forms a particular system of rivers, where the active industry of Angostura and the shore of Caraccas will remain long unknown.

I obtained horary angles of the Sun in an island in the midst of the Boca del Infierno, where we had set up our instruments †. The longitude of this point according to the chronometer is 67° 10' 31". I attempted to determine the magnetic dip and intensity, but was pre-

* See vol. iv, p. 544 and 562.
† At 9h 20' in the morning, the thermometer at the surface of the Oroonoko 28° 2' cent.; in the air, 26° 6'; hygr. 88° Sauss.; sky cloudy.
vented by a heavy storm of rain. As the sky became serene again in the afternoon, we went to rest that night on a vast beach, on the southern bank of the Oroonoko, nearly in the meridian of the little town of Muitaco, or Real Corona. I found the latitude by three stars* to be 8° 0' 26'', and the longitude 67° 5' 19''. When the Observantin monks in 1752 made their first *entradas* on the territory of the Caribbees, they constructed on this spot a small fort, or *casa fuerte*. The proximity of the lofty mountains of Araguacais renders Muitaco one of the most healthy places on the Lower Oroonoko. There Yturriaga took up his abode in 1756, to repose himself after the fatigues of the expedition of the boundaries; and, as he attributed his recovery to this hot rather than humid climate, the town, or more properly the village, of Real Corona took the name of *pueblo del Puerto sano*. In going down the Oroonoko more to the east, we left the mouth of the Rio Pao on the north, and that of the Arui on the south. The latter river is somewhat considerable, and is often mentioned by Raleigh. Geographers have long made the *Aroy* or *Arvi* (*Arui*), the *Caroli

* See my *Obs. Astr.*, vol. i, p. 247. The latitude of Real Corona is consequently near 70° 59' 20''. This result accords accidentally, within a few seconds, with that which the astronomers of the expedition of the boundaries found in 1756. (*Caulin*, p. 56.)

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(Carony), and the Coari* (Caura), take their rise from the famous lake Cassipa, for which they afterward substituted the Laguna del Dorado. The current of the Oroonoko diminished in velocity as we advanced. I measured several times a basis along the beach, to ascertain the time which floating bodies took in traversing a known distance. Above Alta Gracia, near the mouth of the Rio Ujape, I had found the velocity of the Oroonoko 2·3 feet in a second; between Muitaco and Borbou it was only 1·7 foot.

The barometric observations made in the neighbouring steppes prove the smallness of the slope of the ground from the longitude of 69° to the eastern coast of Guyana. We found in this country, on the right bank of the Oroonoko, small formations of primitive gruenstein, superimposed on granite (perhaps even embedded in the rock). We saw between Muitaco and the island of Ceiba a hill entirely composed of balls with concentric layers; in which we perceived an intimate mixture of hornblende and feldspar, with some traces of pyrites. The gruenstein resembles that in the vicinity of Caraccas; but it was impossible to ascertain the position of a formation, which appeared to me to be of the same age as

* The names printed in Italics are the names of the Arui, Carony, and Caura, as disfigured by Raleigh and the geographers Hondius and Sanson.
the granite of Parima. Muitaco was the last spot where we slept in the open air on the shore of the Oroonoko: we navigated two nights more before we reached Angostura, which terminated our voyage. This navigation in the middle of the thalweg of a great river is extremely pleasant; there is nothing to be feared except those natural rafts, formed by trees which the river roots up, when overflowing it's banks. When the nights are dark, canoes are liable to strike against these floating islands, as upon sand-banks.

It would be difficult for me to express the satisfaction we felt on landing at Angostura, the capital of Spanish Guyana. The inconveniences that are undergone at sea in small vessels cannot be compared to those, that are suffered under a burning sky, surrounded by a swarm of moschet-toes, and lying whole months stretched along in a canoe, which on account of it's instability does not permit of taking the least bodily exercise. In seventy-five days we had made a voyage of five hundred leagues (twenty to a degree) on the five great rivers, Apure, Oroonoko, Atabapo, Rio Negro, and Cassiquiare; and in this vast space we had found but a very small number of inhabited places *. Although, after the life we had

* I shall here note for the use of persons who inhabit those countries the following itinerary distances. From San Fer-
led in the woods, our dress was not in very good order, Mr. Bonpland and I hastened to present ourselves to Don Felipe de Ynciarte, the governor of the province of Guyana. He received us in the most obliging manner, and made us lodge with the secretary of the intendance. Coming from an almost desert country, we were struck with the bustle of a town, which has only six thousand inhabitants. We admired the conveniences, with which industry and commerce furnish civilized man. Humble dwellings appeared to us magnificent; and every person, with whom we conversed, seemed to be endowed with superior intelligence. Long privations give a value to the smallest enjoyments; and I cannot express the pleasure, with which we saw for the first time wheaten bread on the governor's table. I am perhaps wrong in recording sensations, that are familiar to all those who have made distant voyages. We enjoy the happiness of finding

nando de Apure to Cabruta, 34 nautical leagues; from Cabruta, or from the confluence of the Oroonoko and the Apure, to Javita, 120 l.; from Javita to San Carlos del Rio Negro, 30 l.; from San Carlos to Esmeralda, 70 l.; from Esmeralda to Angostura, 250 l. Supposing the sources of the Oroonoko to be 30 leagues east of Esmeralda, we find, that the course of the Upper Oroonoko above the Raudale of Maypures comprises 175 leagues; the Lower Oroonoko (from Maypures to the mouths of the river) 260 l. In these estimations the sinuosities of the rivers are assumed, with Mr. de la Condamine, to be one third of the direct distance.
ourselves again in the midst of civilization; but this happiness is of short duration to persons, who are powerfully affected by the marvels, with which nature has embellished the torrid zone. The fatigues we have endured are soon forgotten; and we have scarcely reached the coast, the region inhabited by European colonists, when we form the project of returning to the interior of the country.

A painful circumstance obliged us to sojourn a whole month in the town of Angostura. We felt ourselves on the first days after our arrival tired and weakened, but in perfect health. Mr. Bonpland began to examine the small number of plants, which he had been able to save from the influence of so damp a climate; and I was occupied in settling by astronomical observations the longitude and latitude of the capital*, as

*I found the latitude of Santo Tomas de la Nueva Guyana, vulgarly called Angostura, or the Strait, near the cathedral 8° 8' 11"; the longitude, 66° 15' 21". (Obs. Astr., vol. i, p. 249.) The town is consequently only 0° 15' east of the meridian of the castle of St. Antonio at Cumana. La Cruz and Faden had placed it from 20' to 30' too much to the east, and 4' too much to the south. The dip of the magnetic needle at Angostura, according to my observations, was 39° cent. div. The intensity of force was expressed by 222 oscillations in 10' of time. It is remarkable, that the isodynamic line of Angostura passes through Calabozo (geogr. lat. 8° 58' 3'"), where the dip is only 0° 3° less. See vol. iv, p. 377, 378.
well as the dip of the magnetic needle. These labours were soon interrupted. We were both attacked almost on the same day by a disorder, which with my fellow-traveller took the character of an ataxic fever. At this period the air was in a state of the greatest salubrity at Angostura; and as the only mulatto servant we had brought from Cumana felt the symptoms of the same disorder, the persons who took unwearied care of us had little doubt, that we had imbibed the germe of the typhus in the damp forests of Cassiquiare. It is common enough for travellers, to feel no effects from miasmata till the moment when, having reached a purer atmosphere, they begin to enjoy some repose. A certain excitement of the mental powers may suspend for some time the action of pathogenic causes. Our mulatto servant having been much more exposed to the rains than we were ourselves, his disorder increased with frightful rapidity. His prostration of strength was so great, that on the ninth day his death was announced to us. He was however only in a state of swooning, which lasted several hours, and was followed by a salutary crisis. I was attacked at the same time with a very violent fever, and in the middle of the fit was made to take a mixture of honey and of the extract of the bark of Carony*. This is a remedy much boasted of in

* Extract of the cortex Angosturae.
the country by the Capuchin missionaries. The intensity of the fever augmented, but it left me on the following day. Mr. Bonpland remained in a very alarming state, which during several weeks gave us the most serious inquietude. Fortunately he preserved sufficient strength of mind, to prescribe for himself; and preferred gentler remedies, better adapted to his constitution than the extract of the bark of Carony. The fever was continual; and, as almost always happens within the tropics, a complication of dysentery aggravated the symptoms. In the course of this painful disease Mr. Bonpland displayed that courage and mildness of character, which never forsook him in the most trying situations. I was agitated by sad presages. The botanist Loefling, a pupil of Linneus, had died not far from Angostura, near the banks of the Carony, a victim of his zeal for the progress of natural history. We had not yet passed a year in the torrid zone; and my memory, too faithful, reminded me of every thing I had read in Europe on the dangers of the air that is breathed in the forests. Instead of going up the Oroonoko, we might have sojourned some months in the temperate and salubrious climate of the Sierra Nevada de Merida. It was I who had chosen the path of the rivers; and the danger of my fellow-traveller presented itself to my mind as the fatal consequence of this imprudent choice.
After having attained in a few days an extraordinary degree of exacerbation, the fever assumed a less alarming character. The inflammation of the intestines yielded to the use of emollients drawn from malvaceous plants. The sidas and the melochias have singularly active properties in the torrid zone; the recovery of the patient however was extremely slow, as it always happens with Europeans, who are not thoroughly seasoned to the climate. The period of the rains drew near; and in order to return to the coast of Cumana, it was necessary again to cross the Llanos, where, amid half-inundated lands, a shelter is rarely found, or any other nourishment than meat dried in the sun. To avoid exposing Mr. Bonpland to a dangerous relapse, we resolved to stay at Angostura till the 10th of July. We spent part of this time at a neighbouring plantation *, where mango trees and breadfruit trees † were cultivated. The latter had attained in the tenth year a height of more than forty feet. We measured several leaves of the arto-

* Trapiche of Don Felix Fareras.
† Artocarpus incisa. Father Andujar, Capuchin missionary of the province of Caraccas, zealous in the pursuit of natural history, has introduced the breadfruit tree from Spanish Guyana to Varinas, and thence to the kingdom of New Grenada. Thus the western coasts of America, bathed by the Pacific ocean, receive from the English settlements in the West Indies a production of the Friendly Islands.
carpus that were three feet long, and eighteen inches broad, remarkable dimensions in a plant of the family of the dicotyledons.

I shall terminate this chapter by a succinct description of Spanish Guyana (*Provincia de la Guyana*), which is a part of the ancient *Capitania general* of Caraccas. Having made known at large whatever is remarkable on the banks of the Apure, the Oroonoko, the Atabapo, the Rio Negro, and the Cassiquiare, that relates to the history of our species, and of the productions of nature, it may be interesting to collect these scattered features, and trace the general picture of a country, which, awaiting a higher destiny, begins already to fix the attention of Europe. I shall first describe the situation of Angostura, the present capital of the province; and shall then trace the Oroonoko as far as the *delta*, which it forms at its mouth. Making known at the same time the real course of the Rio Carony, the fertile banks of which contain the greater part of the Indian population of Guyana, I shall show from the history of geography the origin of those fabulous lakes, which long disfigured our maps.

Since the end of the sixteenth century three towns have successively borne the name of *Saint Thomas of Guyana*. The first was opposite the Island of Faxardo, at the confluence of the Carony and the Oroonoko. It was this which was
destroyed * by the Dutch, under the command of captain Adrian Janson, in 1579. The second, founded † by Antonio de Berrio, in 1591, near twelve leagues east of the mouth of the Carony, made a courageous resistance ‡ to Sir Walter Raleigh, whom the Spanish writers of the conquest know only by the name of the pirate Reali. The third town, now the capital of the province, is fifty leagues west of the confluence of the Carony. It was begun in 1764, under the governor Don Juacquin Moreno de Mendoza, and is distinguished in the public documents from the second town, vulgarly called the fortress (el castillo, las fortalezas), or Old Guayana (Vieja Guayana), by the name of Santo Thome de la Nueva Guayana. This name being very long, that of Angostura § (the strait) has been

* Lact, Nov. Orbis, lib. 17, p. 660. Gumilla, vol. i, p. 31, 35, places erroneously the expeditions of Raleigh in the years 1545 and 1547. The first of the voyages undertaken at Raleigh's expense was in 1595; the second, that of Laurence Keymis, in 1596; the third, described by Thomas Masham, in 1597; and the fourth, in 1617. The first and last only were performed by Raleigh in person. This celebrated man was beheaded October the 29th, 1618. (Harris's Coll. vol. ii, p. 252.) It is therefore the second town of Santo Tomas, now called Vieja Guyana, which existed in the time of Raleigh.

† Caulin, p. 175, and not in 1536. (Depons, Voyage à la Terre-Ferme, vol. iii, p. 254.)

‡ Fray Pedro Simon, not. 7, Chap. xxii—xxviii, p. 635—661.

§ Europe has learnt the existence of a town of Angostura
commonly substituted for it. The inhabitants of those countries find it difficult to recognize on our maps, in Santiago de Leon and Santo Thomé, the two capitals of Venezuela and Guyana.

Angostura, the longitude and latitude of which I have already indicated from astronomical observations, stands at the foot of a hill of amphi-bolic schist * destitute of vegetation. The streets are regular, and for the most part parallel with the course of the river. Several of the houses are built on the bare rock; and here, as at Carichana, and in many other parts of the missions, the action of black and strong strata, when strongly heated by the rays of the Sun, upon the atmosphere, is considered as injurious to health. I think the small pools of stagnant water (*lagunas y anegadizos*), which extend behind the town toward the south-east, are

by the trade carried on by the Catalonians in the Carony bark, which is the beneficial bark of the bonplandia trifoliata. This bark, coming from Nueva Guayana, was called *corteza* or *cascarilla del Angostura, cortex Angosturae*. Botanists so little guessed the origin of this geographical denomination, that they began by writing *Augustura*, and then *Augusta*. Very recent political events have rendered the names of the small towns of Angostura, Calabozo, and even of San Fernando de Apure, familiar to those who feel an interest in the struggle between the colonies and the mother-country. The Randal of Cami-seta is called *Angustura* in the maps of Gumilla and D'Anville, 

*Hornblendschiefer.*
more to be feared. The houses of Angostura are lofty, agreeable, and the greater number built of stone; which construction proves, that the inhabitants have little dread of earthquakes. But unhappily this security is not founded on induction from very precise facts. It is true, that the shore of Nueva Andalusia sometimes undergoes very violent shocks, without the commotion being propagated across the Llanos. The fatal catastrophe of Cumana on the 4th of February, 1797, was not felt at Angostura; but in the great earthquake of 1766, which destroyed the same city, the granitic soil of the two banks of the Oroonoko was agitated as far as the Raudales of Atures and Maypures. South of these Raudales shocks are sometimes felt, which are confined to the basin of the Upper Oroonoko and the Rio Negro. They appear to depend on a volcanic focus distant from that of the Caribbee islands. We were told by the missionaries at Javita and San Fernando de Atabapo, that in 1798 violent earthquakes took place between the Guaviare and the Rio Negro, which were not propagated on the north toward Maypures. We cannot be sufficiently attentive to whatever relates to the simultaneity of the oscillations, and to the independance of the movements in contiguous ground. Every thing seems to prove, that the propagation of the commotion is not superficial, but depends on very deep crevices, that terminate in different centres of action.
The scenery around the town of Angostura is little varied; but the view of the river, which forms a vast canal stretching from the south-west to the north-east, is singularly majestic. The government, at the end of a long controversy on the defence of the place, and the reach of cannon shot, wished to know exactly the breadth of the Oroonoko at the point called the strait, where stands a rock (el Pennon), that disappears entirely when the waters are at their height. Though there is an engineer attached to the provincial government, a few months before my arrival at Angostura don Mathias Yturbur had been sent from Caraccas, to measure the Oroonoko between the demolished fort of San Gabriel and the redoubt of San Rafael. I was told vaguely, that this measure had given a little more than eight hundred varas castellanas. The plan of the town, annexed to the great map of South America by La Cruz Olmedilla, indicates nine hundred and forty. I took with great care two trigonometric measurements, one in the strait itself, between the two forts of San Gabriel and San Rafael; the other east of Angostura, in the great walk (Alameda) near the Embarcadero del Ganado. The result of the first measure* (at the minimum of breadth) was three hundred and eighty toises; and that of the

* The base measured along the key, 245.6 met. Angles;
second * four hundred and ninety. These measures surpass four or five times that of the Seine near the Jardin des Plantes, and yet this part of the Oroonoko is called a *choking*, or a *strait*. Nothing is better fitted to give an idea of the mass of water of the great rivers of America, than the dimensions of these pretended straits. The Amazon, according to my measurement †, is two hundred and seventeen toises wide at the *Pongo* de Rentema; and according to Mr. de la Condamine, twenty-five toises at the *Pongo* de Manseriche, and at the *strait of Pauxis*, nine hundred toises. This last strait consequently differs little from the breadth of the Oroonoko at the strait of *Baraguan* ‡.

When the waters are high, the river inundates the keys; and it sometimes happens, that even in the town imprudent men become the prey of crocodiles. I shall transcribe from my journal a fact, that took place during Mr. Bonpland's

74° 33' 10" and 90°. Distance deduced 889 metres, or 456 toises; but we must subtract 76 toises, or the distance from *Punta* San Gabriel to the *Carcel* on the key. Now 456 t. —

76 = 380 t., or 885 *varas cast*.

* Base measured in the *Alameda*, 193.6 met. Angles; 78° 34' 25" and 90. Distance deduced, 958 met. = 491 t., or 1145 *varas*. The breadth naturally varies according to the rising of the waters.

† I measured the Amazon when the water was low, 400 toises above the mouth of the Rio Chinchipe.

‡ I found it to be 889 toises. See Chap. xix, vol. iv, p. 504.
illness. A Guaykeri Indian from the island de la Margareta went to anchor his canoe in a cove, where there were not three feet of water. A very fierce crocodile, that habitually haunted that spot, seized him by the leg, and withdrew from the shore remaining on the surface of the water. The cries of the Indian drew together a crowd of spectators. This unfortunate man was first seen seeking with astonishing courage for a knife in the pocket of his pantaloons. Not being able to find it, he seized the head of the crocodile, and thrust his fingers into its eyes. No man in the hot regions of America is ignorant, that this carnivorous reptile, covered with a buckler of hard and dry scales, is extremely sensible in the only parts of his body which are soft and unprotected, such as the eyes, the hollow underneath the shoulders, the nostrils, and beneath the lower jaw, where there are two glands of musk. The Guaykeri Indian had recourse to the same means which saved the Negro of Mungo Park, and the girl of Uritucu, whom I have mentioned above*: but he was less fortunate than they had been, for the crocodile did not open its jaws, and lose hold of its prey. The animal yielding to the pain plunged to the bottom of the river; and, after having drowned the Indian, came up to the surface of the water, dragging the dead body to

an island opposite the port. I arrived at the moment when a great number of the inhabitants of Angostura had witnessed this melancholy spectacle.

As the crocodile, on account of the structure of it's larynx, of the hyoid bone, and of the folds of it's tongue, can seize, though not swallow, it's prey under water; a man seldom disappears, without the animal being perceived some hours after, near the spot where the misfortune has happened, devouring it's prey on a neighbouring beach. The number of individuals, who perish annually the victims of their own imprudence, and of the ferocity of these reptiles, is much greater, than it is believed to be in Europe. It is particularly so in villages, where the neighbouring grounds are often inundated. The same crocodiles remain long in the same places. They become from year to year more daring, especially, as the Indians assert, if they have once tasted of human flesh. These animals are so wary, that they are killed with difficulty. A ball does not pierce their skin; and the shot is only mortal, when directed at the throat, or beneath the shoulder. The Indians, who know little of the use of fire-arms, attack the crocodile with lances, after it is caught with large pointed iron hooks, baited with pieces of meat, and fastened by a chain to the trunk of a tree. They do not approach the animal till it has struggled a
long time to disengage itself from the iron fixed in the upper-jaw. There is little probability, that a country, in which a labyrinth of rivers without number brings every day new bands of crocodiles from the eastern back of the Andes, by the Meta and the Apure, toward the coast of Spanish Guyana, should ever be delivered from these reptiles. All that will be gained by civilization will be, to render them more timid, and more easily put to flight.

Affecting instances are related of African slaves, who have exposed their lives to save those of their masters, who had fallen into the jaws of a crocodile. A few years ago, between Uritücu and the Mission de Abaxo*, a Negro, hearing the cries of his master, flew to the spot armed with a long knife (machette), and plunged into the river. He forced the crocodile, by putting out his eyes, to let go his prey, and hide himself under the water. The slave bore his expiring master to the shore; but all succour was unavailing to restore him to life. He died of suffocation, for his wounds were not deep. The crocodile, like the dog, appears not to close its jaws firmly while swimming. It is almost superfluous to add, that the children of the deceased, though poor, gave the slave his freedom.

The inhabitants of the banks of the Oroonoko

* In the Llanes of Calabozo.

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and it's tributary streams discourse continually on the dangers, to which they are exposed. They have marked the manners of the crocodile, as the torero has studied the manners of the bull. They have learnt to judge previously, in some sort, of the movements of the animal, it's means of attack, and the degree of it's boldness. When they are assailed, they put in practice with that presence of mind, and that resignation, which characterize the Indians, the Zamboes, and copper-coloured men in general, the counsels they have heard from their infancy. In countries where nature is so powerful and so terrible, man is constantly prepared for danger. We have mentioned above the answer of the young Indian girl, who delivered herself from the jaws of the crocodile. "I knew he would let me go, if I thrust my fingers into his eyes." This girl belonged to the indigent class of the people, in whom the habits of physical want augment the energy of the character; but how can we avoid being surprised, to observe in the countries, convulsed by terrible earthquakes, on the table-land of the province of Quito, women belonging to the highest classes of society display in the moment of peril the same calm, the same reflecting intrepidity? I shall mention one example only in support of this assertion. On the 4th of February, 1797, when 35,000 Indians perished in the space of a few minutes, a young mother saved herself and her children,
crying out to them to extend their arms at the moment when the cracked ground was ready to swallow them up. When this courageous woman heard the astonishment that was expressed at a presence of mind so extraordinary, she answered with great simplicity, "I had been told in my infancy, if the earthquake surprise you in a house, place yourself under a doorway, that communicates from one apartment to another; if you be in the open air, and feel the ground opening beneath you, extend both your arms, and try to support yourself on the edge of the crevice." Thus in savage regions, or in countries exposed to frequent convulsions, man is prepared to struggle with the beasts of the forest, to deliver himself from the jaws of the crocodile, and to escape from the conflict of the elements.

Whenever, in very hot and damp years, pernicious fevers become common at Angostura, the problem is discussed, whether the government did right in transferring the town from the Vieja Guayana to the Strait between the island of Maruanta and the confluence of the Rio Orocopiche. It is asserted, that the ancient town, standing nearer the sea, enjoyed the advantage of the cooling breezes; and that the great mortality prevailing there was less owing to local causes, than to the way of living of the inhabitants. The fertile and
humid banks of the Oroonoko, below the mouth of the Carony, yield an immense quantity of squashes*, plantains, and *papaws†. These fruits were eaten raw, even before they had reached their maturity; and the people being at the same time addicted to the use of spirituous liquors in excess, this improper way of living diminished the population from year to year. The archives of Caraccas are filled with memorials on the necessity of changing the seat of the present capital of Guyana. According to the official papers which have been communicated to me, it has been proposed sometimes to go back to the Fortaleza or Vieja Guayana; sometimes to place the capital close to the great mouth of the Oroonoko, ten leagues west of Cape Parima, at the confluence of the Rio Acquire‡; and sometimes to have it removed twenty-five leagues below Angostura, to the fine savannah that surrounds the Indian village of San Miguel. The government was no doubt influenced by a narrow policy in pretending, that, "for the better defence of the province, it was fit to place the capital at the enormous distance of eighty-five leagues from the sea, and to construct no town in this space, that could be exposed to the incursions of the ene-

* Patillas.
† Fruit of the carica papaya.
‡ Mr. de Pons calls it the Rio Aguirre (vol. iii, p. 333). Compare Cautin, p. 56.
my." Joined to the difficulty which European vessels find in going up the Oroonoko as far as Angostura (which is much greater than that of ascending the Potomac to Washington), the circumstance of the centre of commerce being placed above the point, where the banks of the river present most attraction to the activity of the colonists, is extremely unfavourable to agricultural industry. It is not even true, that the town of Angostura, or Santo Thomè de la Nueva Guayana, was founded where cultivation began in 1764: at that period, as at present, the great mass of the population of Guayana was contained in the missions of the Catalanian Capuchins, between the Rio Carony and the Cuyuni. Now this district, the most important of the whole province, and in which an enemy could procure necessaries of all kinds, is defended, or at least supposed to be so, by *Vieja Guayana*, but in no degree by the fortifications of the new town of Angostura.

The spot which has been proposed near San Miguel is a little to the east of the confluence of the Carony, consequently between the sea and that part of the country which is most inhabited. In going lower down, and transferring the capital of the province close to the mouth of the Oroonoko, as Mr. de Pons proposed, the proximity of the Caribbees, who are easily driven away, is less to be dreaded, than the possibility of an
enemy turning the place, and penetrating into the province by the small western mouths of the Oroonoko, the Canos of Macareo and Manamo. On a river, the delta of which begins to be formed at the distance of forty-six leagues from the ocean, the most advantageous situation for a great town depends on two circumstances, its military defence, and the interests of commerce and of agriculture. Commerce requires, that the town should lie as near as possible to the great mouth of the river, Boca de Navios; while military security leads to the preference of a spot above the formation of the delta, west of the point where the Cano Manamo separates from the principal trunk, and communicates by numerous bifurcations with the eight secondary mouths (bocas chicas) between the island of Congrejos and the mouth of the Rio Guarapiche. The situations both of Vieja and Nueva Guayana fulfil the latter condition; and that of the ancient town has the farther advantage of covering to a certain point the fine establishments of the Catalonian Capuchins of Carony. The settlements may be attacked, by landing on the right bank of the Brazo Imataca; but the mouth of the Carony, where the canoes feel the commotion of the waters of the neighbouring cataracts (salto de Caroni), is defended by the forts of Vieja Guayana.

I have entered into these minute details, be-
cause political events have recently given great importance to those thinly inhabited countries, I have discussed the different projects according to the knowledge of the local circumstances of the Lower Oroonoko, which my situation and my connexions with the Spanish government enabled me to acquire. It is time to oppose the mania, so common in the Spanish and Portugueze colonies, of transplanting towns like a camp of nomade tribes. It is not the importance or solidity of the public edifices, which forbids the destruction of the town of Angostura. It's situation at the foot of a rock seems to limit the means of enlarging it. Notwithstanding these inconveniencies, however, it is better not to destroy what has prospered for fifty years. Ideas of general stability are insensibly annexed to the existence of a capital, however small; and, if the interests of commerce require a partial change, another port might be constructed nearer the great mouth of the Oroonoko, and Angostura be still preserved as the seat of administration, and the centre of public business. Thus, la Guayra is the harbour of Caraccas; and Vera Cruz may one day become the port of Xalapa. The vessels of Europe, and of the United States of America, that may come to stay some months in those latitudes, would willingly go as far up as Angostura; while other vessels would take
in their cargoes in the harbour nearest the Punta Barima, where in time of peace the magazines, ropewalks, and dock-yards, would be found. To protect the country between the capital and the harbour, or Puerto de la Boca grande, from a hostile invasion, the banks of the Oroonoko might be fortified according to a system of defence adapted to the nature of the ground; for instance, at Imataca or at Zacupana, at Baranças or at San Rafael (where the Cano Manamo separates from the principal trunk), at Vieja Guayana, at the island of Faxardo (opposite the mouth of the Rio Carony), and at the confluence of the Mamo. The little forts, constructed at a small expense, would serve at the same time as a refuge for the gun-boats stationed at the points, which the enemy's vessels must approach on tacking, to sail up against the current. I dwell so much the more on these means of defence, as they have been too long neglected*.

The northern coasts of South America are defended for the most part by a chain of mountains, that extends from west to east, and separates the shore from the Llanos of New-Anda-

* It is almost difficult to believe, that the whole defence of the province, during my stay at Angostura, depended on 7 lanchas canoneras, and six hundred soldiers of all complexions and descriptions, including what are called the garrisons of four frontier forts, the destacamentos of Nueva Guayana, San Carlos del Rio Negro, Guirior and Cuyuni.
lusia, Barcelona, Venezuela, and Varinas. It may be observed, that these coasts have fixed the attention of the mother country, too exclusively. There we find six strong places*, provided with a fine and numerous artillery; namely, Carthagena, San Carlos de Maracaybo, Porto-Cabello, La Guayra, le Morro de Nueva Barcelona, and Cumana. The eastern coasts of Spanish America, those of Guayana and Buenos Ayres, are low and without defence; they furnish to a daring enemy the facility of penetrating into the country as far as the eastern back of the Cordilleras of New Granada and Chili. The direction† of the Rio Plata, formed by the Uruguay, the Parana, and the Paraguay, forces an invading army, when it would march toward the east, to traverse the steppes (pampas) as far as Cordova or Mendoza; but north of the equator, in Spanish Guyana, the course‡ of the Lower Oroonoko and it's two great tributary streams, the Apure and the Meta, furnish in the direction of the latitude a path of rivers, which

* Those of Carthagena and Porto Cabello are of the first rank. In naming the points of defence from west to east, I might have mentioned also the batteries Santa Marta, Ciudad de la Hacha, and Coro; but these works are of little importance.

† From south to north, on an extent of land of twenty-two degrees of latitude.

‡ From west to east for thirteen degrees of longitude.
facilitates the transport of stores and provision. He who is master of Angostura may advance at will toward the north, in the steppes (Llanos) of Cumana, Barcelona, and Caraccas; toward the north-west, in the province of Varinas; and toward the west, in those of Cassanare, as far as the foot of the mountains of Pamplona. The plains of the Oroonoko, of the Apure, and of the Meta, alone separate the province of Spanish Guyana from the rich, populous, and well cultivated region near the seashore. The fortified places (Cumana, la Guayra, and Porto Cabello) scarcely protect this region from expeditions landing on the northern coast. I ground these statements on the configuration of the ground, and the present distribution of the points of defence. They will I think suffice to show, how intimately the political security of the United Provinces of Caraccas and New-Grenada is connected with the defence of the mouths of the Oroonoko; and how Spanish Guyana, though scarcely cleared, and destitute of population, acquires a high importance in the struggle between the colonies and the mother country. This military importance was foreseen more than two centuries ago by the celebrated Raleigh. In the account of his first expedition, he often recurs to the facility, with which queen Elizabeth might conquer a great part of the Spanish
colonies*, "by the course of the Oroonoko, and the innumerable rivers which run into it." We mentioned above, that Girolamo Benzoni predicted in 1545 the revolutions of the island of St. Domingo, "which must soon become the property of the Blacks." Here, in a work published in 1596, a plan of campaign is traced, the merit of which has been justified by recent events.

The town of Angostura in the early years of its foundation had no direct communication with the metropolis. The inhabitants were contented with carrying on a trifling contraband trade in dried meat and tobacco with the West India islands, and with the Dutch colony of Essequibo, by the Rio Carony. Neither wine, oil, nor flour, three articles of importation the most sought after, was received directly from Spain.

* The Discoverie of the Empire of Guiana. Lond. 1596, p. 28, 95, and 100. In speaking of the defence of the mouth of the Oroonoko, Raleigh observes judiciously, and with great knowledge of the locality, "This country is besides so defensible, that if two fortes be builded in one of the provinces which I have seen, the flood setteth in so neere the bank, where the channel also lyeth, that no shippe can passe up, but within a pickes length of the artillerie; first of the one, and afterwardes of the other." He then adds, in that style of exaggeration, which appeared to him necessary in order to make his projects of conquest relished, "The two fortes will be a sufficient guarde both of the empire of Inga, and to an hundred other several kingdomes, lying within the said river, even to the citie of Quito in Peru."
Some merchants in 1771 sent the first schooner to Cadiz; and since that period a direct exchange of commodities with the ports of Andalusia and Catalonia has become extremely active. The population of Angostura*, after having been a long time languishing, has much increased since 1785: at the time of my abode in Guyana, however, it was far from being equal to that of Staebroeck, the nearest English town. The mouths of the Oroonoko have an advantage over every other part in Terra Firma. They afford the most prompt communications with the peninsula. The voyage from Cadiz to Punta Barima is performed sometimes in eighteen or twenty days. The return to Europe takes from thirty to thirty-five days. These mouths being placed to windward of all the islands, the vessels of Angostura can maintain a more advantageous commerce with the West Indies than La Guayra and Porto Cabello. The merchants of Caraccas therefore have been always jealous of the progress of industri-

* Angostura, or Santo Thomè de la Nueva Guayana, in 1768, had only 500 inhabitants. (Caulin, p. 63.) They were numbered in 1780, and the result was 1513 (455 Whites, 449 Blacks, 363 Mulattoes and Zamboes, and 246 Indians). The population in the year 1789 rose to 4590; and in 1800, to 6600 souls. (Official Lists, MS.) The capital of the English colony of Demerara, the town of Staebroeck, the name of which is scarcely known in Europe, is only fifty leagues distant, south-east of the mouths of the Oroonoko. It contains, according to Bolingbroke, nearly 10,000 inhabitants.
try in Spanish Guyana; and Caraccas having been hitherto the seat of the supreme government, the port of Angostura has been treated with still less favor than the ports of Cumana and Nueva Barcelona. With respect to the inland trade, the most active is that of the province of Vari- nas, which sends mules, cacao, indigo, cotton, and sugar to Angostura; and in return receives *generos*, that is, the products of the manufacturing industry of Europe. I have seen long boats (*lanchas*) set off, the cargoes of which were valued at eight or ten thousand piastres. These boats went first up the Oroonoko to Ca-bruta; then, along the Apure to San Vicente; and finally, on the Rio Santo Domingo, as far as Torunos*, which is the port of Varinas Nuevas. The little town of San Fernando de Apure, of which I have given a description above†, is the magazine of this river trade, which might become much more considerable by the introduction of steam boats.

The left bank of the Oroonoko, and all the mouths of this river, with the exception of the great *Boca de Navios*, belong to the province of Cumana. This circumstance gave rise long ago to the project of building another town opposite Angostura (where the battery of San Rafael is

* A little to the west of the town of Obispos.
† Chap, 18, vol. iv. p. 392.
now placed), in order to export the mules and dried meat of the Llanos from the territory of the province of Cumana itself, without crossing the Oroonoko. The little jealousies, that always subsist between two neighbouring governments, will serve to favor this project; but in the present state of the cultivation of the country it is to be wished, that it may be postponed yet a long time. Wherefore erect on the banks of the Oroonoko two rival towns, scarcely four hundred toises distant from each other?

I have now described the country through which we passed during a voyage of five hundred leagues; it remains for me to make known the small space of three degrees fifty-two minutes of longitude, that separates the present capital from the mouth of the Oroonoko. The exact knowledge of the delta, and of the course of the Rio Carony, is at once interesting to hydrography, and to European commerce. In order to judge of the extent and configuration of a country intersected by the branches of the Oroonoko, and subject to periodical inundations, I found it necessary to examine astronomically the situation of the points, in which the summit and the extreme branches of the delta terminate. Mr. de Churruca, who was appointed together with Don Juacquin Fidalgo, to survey the northern coasts of Terra Firma and the West India islands, has ascertained the latitude and longi-
tude of la Boca de Manamo, Punta Baxa, and Vieja Guayana. The Memoirs of Mr. Espinosa have made known to us the real situation of Punta Barima; so that on correcting the absolute longitudes by those of Puerto Espana in the island of Trinidad, and of the castle of Saint Antonio at Cumana, (two points settled by my own observations and the judicious researches of Mr. Oltmanns,) I think I can furnish statements sufficiently accurate. It is to be wished, that the difference of meridian between Puerto Espana and the little mouths of the Oroonoko, between San Rafael (the summit of the delta) and Santo Thomè del Angostura, may some day be determined by the chronometer in an uninterrupted voyage. The situation of the latter as I have given it rests on that of Cumana, and (by the confluence of the Apure) on Caraccas and Porto Cabello*.

* See my Obs. Astr., vol, i, p. xxxviii. Espinosa, Memorias de los Navegantes Españoles, vol. i, p. 81, and the Carta esférica de Costas de Tierra Firma de Don Joaquin Francisco Fidalgo publicada en 1816, compared with the sketches of the Bocas del Orinoco, which I procured at Angostura. The following are the results of my researches: Punta Barima, the eastern bank of the great mouth (Boca de Navios) of the Oroonoko, corrected by Puerto España and Portorico, according to Mr. Oltmanns, sixty-two degrees twenty-six minutes forty-six seconds; by Cumana, according to my direct observations, sixty-two degrees twenty minutes ten seconds, I have thought it right to fix on sixty-two degrees, twenty-three minutes, be- because the Spanish navigators set out from the island of Trini-
The whole eastern coast of South America, from Cape Saint Roque, and particularly from the port of Maranham*, as far as the group of the mountains of Paria, is so low, that it appears to me difficult to attribute the delta of the Oroonoko, and the formation of its soil, to the accumulated mud of one river. I do not deny, that the delta of the Nile, according to the testimony of the ancients, was heretofore a gulf of the

dad, and I had settled the longitude of Angostura from that of Cumana, one of the points of America, the position of which rests on the most certain statements. Boca de Manamo, nearly the westernmost of the bocas chicas del Orinoco, sixty-four degrees forty-four minutes. San Rafael, near the point where the Cano Manamo, which forms the bocas chicas, separates from the principal trunk, sixty-four degrees eighteen minutes. Viejo Guayana, sixty-four degrees forty-three minutes. (The latitude observed on land by Churrucu is eight degrees eight minutes twenty-four seconds; almost the same therefore as the latitude of Angostura, which I found to be eight degrees eight minutes eleven seconds. La Cruz and Arrowsmith place Vieja Guayana eighteen and twenty-six seconds north of Angostura.) Santo Thomé del Angostura, sixty-six degrees fifteen minutes twenty-one seconds.

* According to the excellent observations yet unpublished of Baron de Roussin, captain in the French navy, who has lately made a survey of the coast of Brazil, the latitude of Fort St. Antonio de la Barre is two degrees twenty-nine minutes two seconds south; longitude forty-six degrees thirty-four minutes fifty-nine seconds (supposing the fort Anathomirim in the island of St. Catherine fifty degrees fifty-one minutes fifteen seconds west of Paris).
Mediterranean, filled up by successive alluvions. It may be easily conceived, that at the mouth of all great rivers, where the velocity of the stream suddenly diminishes, a bank, an island, a deposition of substances which cannot be carried on farther, is formed. It may also be conceived, that the river, obliged to flow round this new bank, divides itself into two branches; and that the accumulating earth, finding a point of support at the summit of the delta, extends farther and farther, widening these branches*. What takes place at the first bifurcation may be effected in each partial channel; so that by the same processes, nature may form a labyrinth of small bifurcated channels, which are filled up or grow deeper in the lapse of ages, according to the force and direction of the waters. The principal trunk of the Oroonoko has no doubt in this manner divided itself, twenty-five leagues west of the Boca de Navios, into two branches, those of the Zacupana and Imataca. The network of less considerable branches which the rivers ends toward the north, and the mouths of which bear the name of bocas chicas (little mouths), appears to be a phenomenon entirely similar to that of the deltas of tributary streams†. When

* Girard, sur la Vallée d'Egypte, p. 56.
† On the deltas of tributary streams opposed to the oceanic deltas, see above, chap. xxiii, p. 466.
a river several leagues from the coast (for instance the Apure or the Jupura) joins another river by a great number of branches, these multiplied bifurcations are merely furrows traced in a very flat soil. It is the same with the oceanic deltas, wherever the coasts, by general inundations anterior to the existence of the Oroonoko and the Amazon, have been covered by deposits of accumulated earth. I doubt whether all these oceanic deltas have been gulfs, or, as some modern geographers say, negative deltas. When the mouths of the Ganges, the Indus, the Senegal, the Danube, the Amazon, the Oroonoko, and Mississippi, have been more carefully examined in a geological view, it will be perceived, that they have not all the same origin; the coasts that advance abruptly into the sea from the effect of increasing alluvions* will be distinguished from those, that follow the general configuration of the continents; lands formed by a bifurcated river will be distinguished from plains traversed by a few lateral branches, forming part of a soil of alluvions, the extent of which exceeds several thousand square leagues.

The delta of the Oroonoko, between the Isla Cangrejos and the Boca de Manamo, (the land inhabited by the Guaraon Indians,) may be

* Like the deltas of the Nile, the Ganges, the Danube, and the Mississippi.
compared to the island of Marajo or Joanes*, near the mouth of the Amazon. One of these pieces of alluvial land is on the north, the other on the south of the principal trunk of the river. But the form of the island Joanes is connected with the general configuration of the soil of the province of Maranhao, as the coasts of the *bocas chicas* of the Oroonoko are with that of Essequibo and the gulf of Paria. Nothing appears to me to prove, that this gulf extended formerly toward the south from the *boca de Manamo* as far as Vieja Guayana; or that the Amazon filled with it’s waters the whole bay between Villa Vistoza and Grand Para. All that surrounds rivers is not their own work. They have most frequently scooped themselves out a bed in alluvial lands, the origin of which dates from more ancient geologic causes, from the great ca-

* This pretended island, which the jesuit Andrew da Barros asserts to be larger than the kingdom of Portugal, though it is only fifteen hundred square leagues, is inhabited by the Nhengahybas (or Igaruanas, that is, boatmen), who know the mouth of the Amazon as well as the Guaraons know that of the Oroonoko. The topography of the island Joanes, and of the vicinity of Belem or of Para, has little accuracy on the most recent maps. The following is the real state of things: a very narrow channel (the Tagypuru) issues from the Amazon below the Villa de Gurupa, and joins the lake Annapu near the town of Melgaço. The Rio Annapu, which is the Guanapu of D’Anville, falls into this lake. East of Melgaço, the Tagypuru receives the great river of the Tocantins, on which stands the town of Para.

3 A 2
tastrophes which our planet has undergone. It is proper to examine, whether between the bifurcated branches of a river the mud do not repose upon a stratum of pebbles, which are found far from running waters. The greatest separation of the branches of the Oroonoko is forty-seven nautical leagues. This is the breadth of the oceanic delta between Punta Barima and the westernmost of the bocas chicas. An exact survey of those countries being hitherto wanting, the number of the mouths is not known. A vulgar tradition gives seven to the Oroonoko, and reminds us of the septem ostia Nili, so celebrated in antiquity. But the delta of Egypt was not always confined to this number; and eleven considerable mouths at least may be counted on the inundated coast of Guyana*. After the Boca de

* Boca de Navios; B. de Lauran (Loran, Laurent); B. de Nuina, two or three leagues west of the Isla Cangrejos, and two or three fathoms deep; B. chica de Mariusas, five leagues farther, little known; B. de Vinquinia; B. grande de Mariusas, very navigable; B. de Macareo (the cano of this name admits large vessels as far as San Rafael, where it issues from the principal trunk); B. de Cucuina, narrower, but deeper; B. de Pedernales, navigable; B. de Manamo grande, near the islands of Plata and Pesquero; B. de Guanipa. From boca de Nuina to boca de Manamo grande, the partial distances were indicated to me at five, seven, eight, six, four, eight, and seven leagues. The synonymy of these branches of the Oroonoko is somewhat embarrassing. Is not the B. de Capure, between Pedernales
Navios, which mariners recognize by the Punta Barima, the Bocas of Mariusas, Macareo, Pedernales, and Manamo grande, are most useful for navigation. That part of the delta, which extends to the west of the Boca de Macareo, is bathed by the waters of the gulf of Paria, or Golfo triste. This basin is formed by the eastern coast of the province of Cumana, and the western coast of the island of Trinidad; it communicates with the Caribbean sea by the famous mouths of the Dragon (Bocas de Dragos), which the coasting pilots have regarded ever since the time of Christopher Columbus, though improperly, as the mouths of the Oroonoko*.

and Macareo, identical with the B. de Cucuina? Does not the Cano de Laurent, which is said to be extremely wide where it separates from the Oroonoko, and very narrow at it's mouth, lead to one of the two Bocas de Mariusas?

* The waters, which issue so impetuously from the Bocas de Dragos (See chap. 3, vol. ii, p. 29), are 1st, those of the Atlantic Ocean, the currents of which run toward the coast of Guyana through the Canal del Sur (between Punta de Mangles of the continent, and Punta Galiota of the island of Trinidad) west-north-west; 2d, the fresh waters of the Bocas chicas of the Oroonoko (of the Canos Pedernales and Manamo grande joined with that of the great Rio Guarapiche). It cannot be doubted, that the gulf of Paria formed heretofore an inland basin, when the island of Trinidad was still united on the north to cape Paria, and on the southwest (Punta de Icacos) to the Punto Foleto, situate east of the boca de Pedernales. Three small rocky islands, partly cultivated with cotton (Islas de Monos, de Huebos and de Cha-
When a vessel coming from sea would enter the principal mouth of the Oroonoko, the \textit{boca de Navios}, it should make the land at the Punta Barima. The right or southern bank is the highest: the granitic rock pierces the marshy soil at a small distance in the interior, between the Canno Barima, the Aquire, and the Cuyuni. The left, or northern bank of the Oroonoko, which stretches along the \textit{delta} toward the Boca de Mariusas and the Punta Baxa*, is very low; and is distinguishable at a distance only by the clumps of Mauritia palm-trees, which embellish the passage. This is the sago-tree \textdagger of the

\textit{cachacares}) divide the passage, which is three or four leagues broad (between the north-west cape of the island of Trinidad, near the port of Chaguaramas, and the Punta de la Pena, the eastern extremity of the coast of Paria) into four small channels; \textit{Boca de Monos, B. de Huebos, B. de Navios, and B. grande}. These mouths collectively are called \textit{Bocas de Dragos}. There are some other small islands nearer the eastern coast of Paria (\textit{El Fraile, El Pato, and El Patito}), the existence of which attests the convulsions, to which this country has been exposed.

\footnote{According to Churruca, lat. $9^\circ 35' 30''$ (or $0^\circ 54' 55''$ farther north than Punta Parima). I find the longitude to be $63^\circ 21'$, as deduced from my observations at Cumana.}

\footnote{The nutritious fectula or medullary flour of the sago trees is found principally in a group of palms, which Mr. Kunth has distinguished by the name of \textit{calameca}. It is collected however in the Indian Archipelago as an article of trade from the trunks of the cycas revoluta, the \textit{phoenix farinifera}, the \textit{corypha umbraculifera}, and the \textit{caryota urens}.}
country; it yields the flour of which the yuruma bread is made, and, far from being a palm-tree of the shore, like the chamaerops humilis, the common cocoa-tree, and the lodoicea of Commerson, is found as a palm-tree of the marshes as far as the sources of the Oroonoko*. 

*See above, p. 503. I dwell much on these divisions of the great and fine families of palms according to the distribution of the species: 1st, in dry places, or inland plains (corypha tectorum); 2d, on the sea coast (chamaerops humilis, cocos nucifera, corypha maritima, lodoicea sechelliarum, Labill.); 3d, in the fresh water marshes (sagus rumphii, mauritia flexuosa); and 4th, in the alpine regions between seven and fifteen hundred toises high (ceroxylon andicola, oreodoxa frigida, kunthia montana). This last
In the season of inundations these clumps of mauritia, with their leaves in the form of a fan, have the appearance of a forest rising from the bosom of the waters. The navigator, in proceeding along the channels of the delta of the Oroonoko at night, sees with surprise the summit of the palm-trees illumined by large fires. These are the habitations of the Guaraons (Tivitivas and Waraweties of Raleigh*), which are suspended from the trunks of trees. These tribes hang up mats in the air, which they fill with earth, and kindle, on a layer of moist clay, the fire necessary for their household wants. They have owed their liberty and their political independence for ages to the quaking and swampy soil, which they pass over in the time of drought, and on which they alone know how to walk in security to their solitude in the delta of the Oroonoko, to their abode on the trees, where religious group of palmae montanae, which rises in the Andes of Guanacas nearly to the limit of perpetual snow, was (I believe) entirely unknown before our travels in America. (Nov. Gen. vol. i, p. 317; Semanario de Santa Fe de Bogota, 1819, No.21, p. 163.)

* The Indian name of the tribe of Uaraus (Gurarau-nos of the Spaniards) may be recognized in the Warawety (Ouarauety) of Raleigh, one of the branches of the Tivitivas. See Discovery of Guiana, 1576, p. 90, and the sketch of the habitations of the Guaraons, in Raleghi brevis Descrip. Guiana, 1594, tab. 4. (Laet. p. 648, 661; Gili, vol. i, p. xxxv; Depons, vol. i, p. 292, 306; Leblond, p. 430, 444.)
enthusiasm will probably never lead any American stylites*. I have already mentioned in another place, that the mauritia palm-tree, the tree of life of the missionaries, not only affords the Guaraons a safe dwelling during the risings of the Oroonoko; but that it's shelly fruit, it's farinaceous pith, it's juice abounding in saccharine matter, and the fibres of it's petioles, furnish them with food, wine†, and thread proper for making cords and weaving hammocks. These customs of the Indians of the delta of the Oroonoko were found formerly in the Gulf of Darien (Uraba), and in the greater part of the inundated lands between the Guarapiche and the mouths of the Amazon. It is curious to observe in the lowest degree of human civilization the existence of a whole tribe depending on one single species of palm-tree, similar to those insects, which feed on one and the same flower, or on one and the same part of a plant.

We must not be surprised to find the breadth

* This sect was founded by Simeon Sisanites, a native of Syria. He passed thirty-seven years in mystic contemplation, on five pillars, the last of which was thirty-six cubits high. The Sancti columnares attempted to establish their aerial cloisters in the country of Treves, in Germany; but the bishops opposed these extravagant and perilous enterprises. (Mosheim, Instit. Hist. Eccles., p. 192.)

† The use of this murichi wine however is not very common. The Guaraons prefer in general a beverage of fermented honey.
of the principal mouth of the Oroonoko (Boca de Navios) so differently estimated. The great Island Cangrejos is separated only by a narrow channel from the inundated land, which extends between the Bocas de Nuina and de Mariusas, so that twenty or fourteen nautical miles (at nine hundred and fifty toises) are obtained, according as the measure is taken (in a direction opposite to that of the current) from Punta Barima to the nearest opposite bank, or from the same Punta to the eastern bank of the Isla Cangrejos. The navigable channel is crossed by a sand-bank or bar, on which are seventeen feet of water; the breadth of which is supposed to be from two thousand five hundred to two thousand eight hundred toises. The Oroonoko, like the Amazon, the Nile, and all the rivers that separate into several branches, is less wide at the mouth, than might be supposed from the length of it's course, and the breadth it preserves at some hundred leagues inland. It is known from the labours of Malaspina, that the Rio de la Plata, from Punta del Este near Maldonado as far as Cabo San Antonio, is more than one hundred and twenty-four miles (41.3 leagues) broad; but in going up toward Buenos Ayres, this breadth diminishes so rapidly, that opposite the Colonia del Sacramento it is already no more than twenty-one miles. What is commonly called the mouth of
the Rio de la Plata is but a gulf, into which the Uruguay and the Parana fall, two rivers much less considerable in breadth than the Oroonoko. In order to exaggerate the breadth of the mouth of the Amazon, the islands of Marajo and Caviana are considered as comprised within it; so as to give the immense breadth of 3·5°, or 70 leagues, from la Punta Tigioca to Cabo del Norte. But an examination of the hydraulic system of the channel of Tagypuru, the Rio Tocantins, the Amazon, and the Araguari, which unite the immense volume of their waters, is sufficient to show, how chimerical this estimation is. Between Macapa and the western bank of the island Marajo (ilha de Joanès), the Amazon, properly so called, is divided into two branches, which together are only thirty-two miles (eleven leagues) broad. Lower down, the northern bank of the island of Marajo stretches east and west, while the coast of Portugueze Guayana, between Macapa and Cabo del Norte, runs from south to north. Hence it follows, that the Amazon, where the two islands of Maxiana and Caviana are situate, and the waters of the river first come into contact with those of the Atlantic, forms a gulf nearly forty miles broad. The Oroonoko is inferior to the Amazon in the length of it's course, still more than in it's breadth within land: it belongs to the rivers of the second rank. But it must be remarked, that all these
classifications, from the length of the course, or the breadth of the mouth of rivers, are extremely arbitrary. The rivers of the British islands are terminated by gulfs or lakes of fresh water, in which the tides cause swellings and periodical oscillations; and remind us sufficiently, that we must not judge of the importance of an hydraulic system * merely from the extent of the mouths of rivers. Every idea of *relative magnitude* fails in precision, if we cannot compare the volume of the waters, ascertained by the measurement of the velocity, and the area of the transverse sections †. It is to be regretted, that measurements of this kind require facilities, which solitary travellers can scarcely procure; that, for instance, of sounding the whole bed of a river, and of sounding it at different times of the year. Rivers of great apparent breadth having basins of little depth, and traversed by several parallel furrows ‡, they contain much less water, than their first view would lead us to suppose; and the volume of their waters varies so considerably

* The Thames and the Severn; and in the New World the Rio Guayaquil, which rises at the foot of Chimborazo, and exhibits a striking disproportion between the brevity of it's course, and the breadth of it's mouth.

† For the knowledge of these active sections (sections vivas) in the Ganges and the Nile we are indebted to the important labours of Major Rennell and Mr. Girard.

‡ See above, p. 464.
at the two periods of their maximum and minimum *, that during the floods it is often fifteen or twenty times as much as at the season of drought.

When we have doubled the Punta Barima, and entered the bed of the Oroonoko, we find it to be only three thousand toises in breadth. Greater estimations have arisen from the error of pilots in measuring the river in a line not perpendicular to the direction of the current. It would be useless to fortify the island of Can-grejos, near which the water is from four to five fathoms deep. Vessels there would be out of gun-shot. The labyrinth of channels that lead to the little mouths (bocas chicas) changes daily

* Mr. Girard found the volume of the Nile, at the port of Syout, in the time of low water, 678 cubit metres in a second, while the gauges gave him during the inundations 10247 cubic metres (sur la Vallée d’Egypte, p. 13). We may judge by analogy of the enormous increase of the Oroonoko, if we recollect, that it rises 25 feet in places where I found it’s mean breadth to be 1000 toises. The following is a comparative table of some of the great rivers of the New World, calculating the length of the course, according to the most recent maps, and adding one third for the sinuosities:

The Amazon, 980 leagues, of 20 to a degree.

The Mississippi, 560 leagues, in going up by the principal branch to the Chippeway, but 815 leagues in going up to the sources of the Missouri.

The Rio de la Plata, 530 leagues, in going up by the Rio Paraguay.

The Oroonoko, the known part 420 leagues. (The Indus has a course of 510, and the Ganges of 426 leagues.)
in depth and figure. Many pilots are persuaded, that the Cannos of Cocuina, Pedernales, and Macareo, by which a smuggling trade is carried on with the island of Trinidad, have gained in depth of late years; and that the river has a tendency to withdraw from the Boca de Navios, and to run toward the north-west. Before the year 1760, barks that drew more than ten or twelve feet of water seldom ventured into the little channels of the delta. The fear of the small mouths of the Oroonoko has now almost vanished; and enemies' ships, which have never navigated in those parts, find officious and experienced guides in the Guaraons. The civilization of this tribe, which may be compared from it's situation to the Nhengahybas or Igaruanas of the mouths of the Amazon, is of the highest importance to a government that would remain master of the Oroonoko.

The flux and reflux of the tide are felt in the month of April, when the river is lowest, beyond Angostura, at a distance of more than eighty-five leagues* in the inland. At the con-

* The difference of longitude is 3° 52'. It may seem surprising, that, admitting here with common pilots only eighty-five nautical leagues distance, I estimate the sinuosities of the Oroonoko below Angostura only at one ninth. I believe, however, that this estimation is not too small; since, having measured on a very accurate manuscript map which I possess, with an opening of the compasses of 9', the sinuosities of the
fluence of the Carony, sixty leagues from the coast, the water rises one foot three inches. These oscillations of the surface of the river, this suspension of its course, must not be confounded with a tide that flows up. At the great mouth of the Oroonoko, near Cape Barima, the tide rises to a height of two or three feet; but farther

Oroonoko from the mouth of the Rio Mamo (ten leagues above that of the Carony) to Punta Barima, I found 207', while an opening of the compasses of half a degree gave me 186'. We must not hence conclude, that La Condamine and d'Anville are in an error, when, in order to estimate the course of a river, they add in general one quarter or one third. (Journal des Savans, Jan. 1750, p. 183.) This point being of great importance for the construction of maps, I had much satisfaction in being able to verify it recently. The learned commentator on Strabo, Mr. Gosselin, has measured the sinuosities of the Nile on the great map of the institute of Egypt in forty-seven sheets, with an opening of the compasses of 1000 metres, or nearly one third of a nautical league; and he found the length of the course of the waters from Syene to Damietta 1,180,400 metres, or, at a mean degree, 637' 35" (near 212 nautical leagues of 5562 metres). Geogr. de Strabon, vol. v, p. 308. Now I found 173 leagues, with an opening of the compasses of half a degree, on the fine map of Colonel Leake. The sinuosities of a river, therefore, which is not very winding, were a little more than one quarter. D'Anville adopted this same proportion for the Napo and the Pastaza. In the most tortuous rivers nearly one third must be added, if the length of the course have been measured with an opening of the compasses from 30' to 1°, that is, suppressing sinuosities less than this space. (La Condamine, Voyage à l'Amazone, p. 67.)
on toward the north-west, in the Golfo triste, between the boca de Pedernales, the Rio Guarapiche, and the western coast of Trinidad, the tides rise seven, eight, and even ten feet. Such is the influence of the configuration of the coast, and of the obstacles which the Mouths of the Dragon present to the running off of the waters, on points thirty or forty leagues distant from each other. All that is related in very recent works, on the particular currents caused by the Oroonoko at 2° or 3° distance in the open sea, on the changes observed in the colour of the sea, and on the fresh waters of the Golfo Triste (Mar dulce of Gumilla), is entirely fabulous. The currents, on the whole of this coast, run from Cape Orange toward the north-west; and the variations, which the fresh waters of the Oroonoko produce in the force of the general current, and in the transparency and the reflected colour of the sea, rarely extend farther than three or four leagues east-north-east of the island of Cangrejos. The waters in the Golfo triste are salt, though in a less degree than in the rest of the Caribbean Sea, on account of the small mouths of the Delta of the Oroonoko, and the mass of water furnished by the Rio Guarapiche. For these reasons there are no salt-pits on this coast; and I have seen vessels from Cadiz arrive at Angostura laden with salt, and (which characterises the state of colonial industry) even with bricks for building the cathedral.
The astonishing distance at which the little tides of the coast are felt in the bed of the Oroonoko and of the Amazon *, has been hitherto considered as a certain proof, that these two rivers have only a slope of a few feet during a course of eighty-five and of two hundred leagues. This proof however does not appear irrefragable, if we reflect, that the magnitude of the transmitted undulations depends much on local circumstances, on the form, the sinuosity, and the number of the channels of communication, the resistance of the bottom on which the tide flows up, the reflexion of the waters by the opposing banks, and their confinement in a straight. A skilful engineer † has recently shown, that, in the bed of the Garonne, the oscillations of the tides go up, as on an inclined plain, far above the level of the waters of the sea at the mouth of the river. At the Oroonoko, the tides of unequal height of Punta Barima and of Golfe triste are transmitted in unequal intervals of time by the great channel of the Boca de Navios, and by

* The river of Amazones swells periodically at the strait of Pauxis, 192 leagues from the coast.

† Mr. Bremontier. At la Réole the tide appears to flow ten toises, at Bourdeaux five toises, above the low-water mark near Royan. Yet the tides are the same height at Royan and at Bourdeaux. It were to be wished, that these data could be rectified by a more accurate survey. (*Recherches sur le Mouvement des Eaux, p. 809, § 72 and 83.*)
the narrow, winding, and numerous channels of the *bocas chicas*. As these little channels separate at one point only from the principal trunk near San Rafael, curious researches might be made on the retardation of the tides, and the propagation of the waves in the bed of the Oroonoko, above and below San Rafael, at Cape Barima in the ocean, and at the boca of Manamo in the *Golfe triste*. Hydraulic architecture, and the theory of the movement of fluids in contracted channels, would alike gain from a labour, for the execution of which the Oroonoko and the Amazon furnish peculiar facilities.

The navigation of the river, whether vessels arrive by the *Boca de Navios*, or risk entering the labyrinth of the *Bocas chicas*, requires various precautions, according as the *bed is full*, or the *waters very low*. The regularity of these periodical risings of the Oroonoko has been long an object of admiration to travellers, as the overflows of the Nile furnished the philosophers of antiquity with a problem difficult to solve. The Oroonoko and the Nile, contrary to the direction of the Ganges, the Indus, the *Rio de la Plata*, and the Euphrates, flow alike from the south toward the north; but the sources of the Oroonoko are five or six degrees nearer the equator, than those of the Nile. Observing every day the accidental variations of the atmosphere, we find it difficult to persuade
ourselves, that in a great space of time the effects of these variations mutually compensate each other: that in a long succession of years the means of the temperature of the humidity, and of the barometric pressure, differ so little from month to month; and that nature, notwithstanding the multitude of partial perturbations, follows a constant type in the series of meteorologic phenomena. Great rivers unite in one receptacle the waters, which a surface of several thousands of square leagues receives. However unequal may be the quantity of rain, that falls during several successive years in such or such a valley, the swellings of rivers, that have a very long course, are little affected by these local variations. The swellings represent the mean state of the humidity, that reigns in the whole basin; they follow annually the same progression, because their commencement and their duration depend also on the mean of the periods, apparently extremely variable, of the beginning and end of the rains in the different latitudes, through which the principal trunk and its various tributary streams flow. Hence it follows, that the periodical oscillations of rivers are, like the equality of temperature of caverns and springs, a sensible indication of the regular distribution of humidity and heat, which takes place from year to year on a considerable extent of land. They strike the imagination of the
vulgar, as order every where astonishes, when we cannot easily ascend to first causes; as the means of temperature of a long succession of months or years surprise those, who see for the first time a treatise on climates. Rivers that belong entirely to the torrid zone display in their periodical movements that wonderful regularity, which is peculiar to a region where the same wind brings almost always strata of air of the same temperature; and where the change of the Sun in it's declination causes * every year at the same period a rupture of equilibrium in the electric intensity, in the cessation of the breezes, and the commencement of the season of rains. The Oronoko, the Rio Magdalena, and the Congo or Zaire, are the only great rivers of the equinoxiial region of the globe, which, rising near the equator, have their mouths in a much higher latitude, though still within the tropics. The Nile and the Rio de la Plata direct their course in the two opposite hemispheres, from the torrid zone toward the temperate †.

* See the theory which I explained above, vol. iv, p. 409.
† In Asia, the Ganges, the Burampooter, and the majestic rivers of Indo-China, direct their course toward the equator. The former flow from the temperate to the torrid zone. This circumstance of courses pursuing opposite directions (toward the equator, and toward the temperate climates) has an influence on the period and the height of the risings, on the nature and variety of the productions on the banks of the rivers, on the
As long as, confounding the Rio Paragua of Esmeralda with the Rio Guaviare, the sources of the Oroonoko were sought toward the south-west, on the eastern back of the Andes, the risings of this river were attributed to a periodical melting of the snows. This reasoning was as far from the truth as that, in which the Nile was formerly supposed to be swelled by the waters of the snows of Abyssinia. The Cordilleras of New Grenada, near which the western tributary streams of the Oroonoko*, the Guaviare, the Meta, and the Apure, take their rise, enter no more into the limit of perpetual snows, with the sole exception of the Paramos of Chita and Mucuchies, than the Alps of Abyssinia. Snowy mountains are much more rare in the torrid zone†, than is generally admitted; and the melting of the snows, which is not copious there at any season, does not at all increase at the time of the inundations of the Oroonoko. The sources of this river are found (east of the Esmeralda) in the mountains of Parima, the highest summits of which do not exceed 1,200

less or greater activity of trade, and, I may add, from what we know of the nations of Egypt, Meroë, and India, on the progress of civilization along the valleys of the rivers.

* See above, p. 201, 215, and 319.

or 1,300 toises in elevation; and from la Grita as far as Neiva (from 7°5′ to 3° of latitude) the eastern branch of the Cordillera presents numerous Paramos from 1800 to 1900 toises high *; and only one group of Nevados, that is of mountains which surpass 2400 toises, in the five Pica- chos of Chita. The three great western tributary streams of the Oroonoko rise from the Paramos de Cundinamarca, which are destitute of snow. The secondary tributary streams only, which fall into the Meta and the Apure, receive some águas de nieve, such as the Rio Casanare, which descends from the Nevado de Chita, and the Rio Santo Domingo †, which descends from the

* From north to south; the Paramos of Porqueras and of Laura (near la Grita); of Cacota; of Almorzadero, Zoraca, Guachaneque, and Chingasa (between Pamplona and Santa Fe de Bogota); la Suma Paz, between Pandi and Neiva. See my Atlas Geogr., Pl. 17, 19, 21, 24. The mean temperature of the mountainous deserts, which the Spanish inhabitants of the equinoctial zone call Paramos, is 9°. I sometimes found the centigrade thermometer there at 4°. I saw no snow fall sporadically under the equator below 1860 or 1900 toises of absolute height. See the Memoir which I have just cited, p. 36.

† The Nevado de Mucuchies, the eastern part of the Sierra Nevada de Merida, gives rise on the south to the Rio de Santo Domingo; and on the north to the Rio Chama, which runs into the gulf of Maracaybo. A tributary stream of the first of these rivers, the Paguay, comes from the western part of the Sierra Nevada de Merida. There is therefore, in the whole circumference of the basin of the Oroonoko, no other
Sierra Nevada de Merida, and traverses the province of Varinas.

The cause of the periodical swellings of the Oronoko acts equally on all the rivers, that take rise in the torrid zone. After the vernal equinox, the cessation of the breezes announces the season of rains. The increase of the rivers, which may be considered as natural ombrometers, is in proportion to the quantity of water, that falls in the different regions. This quantity, in the centre of the forests of the Upper Oronoko and the Rio Negro, appeared to me to exceed 90 or 100 inches annually.* Such of the natives therefore, as have lived beneath the misty sky of the Esmeralda and the Atabapo, know, without the smallest notion of natural philosophy, what Eudoxus and Eratosthenes knew heretofore†, that the inundations of the great rivers are owing solely to the equatorial rains. The following is the usual progress of the oscillations of the Oronoko. Immediately after the vernal equinox (the people say on the 25th of March), the commencement of the rising is perceived. It is at first only an inch in twenty-four hours;

summit that enters into the region of perpetual snows, but that Sierra Nevada de Merida (lat. 7° 50′), and the Nevado de Chita (lat. 5° 45′).

* See above, p. 248 and 326.
sometimes the river again sinks, in April; it attains it's maximum in July; remains full (at the same level) from the end of July till the 25th of August; and then decreases progressively, but more slowly than it increased. It is at it's minimum in January and February. In both worlds the rivers of the northern torrid zone attain the greatest height nearly at the same period. The Ganges, the Niger, and the Gambia, reach the maximum, like the Oroonoko, in the month of August*. The Nile is two months later; either on account of some local circumstances in the climate of Abyssinia, or of the length of it's course, from the country of Berber, or 17°5 of latitude †, to the bifurcation

* Nearly forty or fifty days after the summer solstice.

† The point (17°35') where the Tacazze, or Astaboras, enters the Nile. (See the excellent work of Mr. Burckhardt, p. 163.) The Nile receives no river below this, either on the east or on the west; a solitary instance in the hydrographic history of the globe. The distance from the mouth of the Tacazze to the Delta is nearly 1350 nautical miles; so that admitting the mean velocity of the Nile (Girard, p. 13) to be four feet in a second, or two miles and a half in an hour, I find twenty-two days and a half for the time of the descent of a particle of water. This is also nearly the time a swell would take to descend from the sources of the Oroonoko to it's mouth, through an itinerary length of 1308 nautical miles. The velocity of the Nile in Nubia is no doubt a little greater, than I have estimated it in this calculation. The retardation of the oscillations of the Nile is very remarkable, compared
of the Delta. The Arabian geographers assert, that in Sennaar and in Abyssinia the Nile begins to swell in the month of April (nearly as the Oroonoko); the rise however does not become sensible at Cairo till toward the summer solstice; and the water attains it's greatest height at the end of the month of September.* The river keeps at the same level till the middle of October; and is at it's minimum in April and May, a period when the rivers of Guyana begin to swell anew. It may be seen from this rapid statement, that, notwithstanding the retardation caused by the form of the natural channels, and by local climatic circumstances, the great phenomenon of the oscillations of the rivers of the torrid zone is everywhere the same. In the two zodiacs vulgarly called Tatar and Chaldean, or Egyptian, (in the zodiac which contains the sign of the Rat, and in that which contains those of the Fishes and Aquarius,) particular constellations are consecrated to the periodical overflows of the rivers. Real cycles, divisions of time, have been gradually transformed into divisions of space; but the generality of the physical phenomena of the risings seems to prove, that the zodiac which has been transmitted to us by the Greeks, and which, by the precession of

with those of other rivers of the tropics. Does this denote a more remote cause of the rising of the waters?

* Nearly eighty or ninety days after the summer solstice,
the equinoxes, becomes an historical monument of high antiquity, may have taken birth far from Thebes, and from the sacred valley of the Nile. In the zodiacs of the New World, in the Mexican for instance, of which we discover the vestiges in the signs of the days, and the periodical series which they compose, there are also signs of rain and of inundation corresponding to the Chou (Rat) of the Chinese* and Thibetan cycle of Tse, and to the Fishes and Aquarius of the dodecatemorion. These two Mexican signs are Water (Atl) and Cipactli, the sea monster furnished with a horn. This animal is at once the Antelope-fish of the Hindoos, the Capricorn of our zodiac, the Deucalion of the Greeks, and the Noah (Coxcox) of the Aztecks†. Thus we

* The figure of water itself is often substituted for that of the Rat (Arvicola) in the Tatar zodiac. The Rat takes the place of Aquarius. (Gaubil, Obs. mathém., vol. iii, p. 33.)

† Coxcox bears also the denomination of Teo-Cipactli, in which the root god or divine is added to the name of the sign Cipactli. It is the man of the fourth age; who, at the fourth destruction of the world (the last renovation of nature), saved himself with his wife, and reached the mountain of Colhuacan. According to the commentator Germanicus, Deucalion was placed in Aquarius; but the three signs of the Fishes, Aquarius, and Capricorn (the antelope-fish), were heretofore intimately linked together. "The animal, which, after having long inhabited the waters, takes the form of an antelope, and climbs the mountains, reminds people, whose restless imagination seizes the most remote similitudes, of the ancient traditions of Menou, of Noah, and of those Deucalions cele-
find the general results of *comparative hydrography* in the astrological monuments, the divisions of time, and the religious traditions of nations the most remote from each other in their situation, and in their degree of intellectual advancement.

As the equatorial rains take place in the flat country when the Sun passes through the zenith of the place, that is when it's declination becomes *homonymous* with the zone comprised between the equator and one of the tropics, the waters of the Amazon sink, while those of the Oroonoko rise perceptibly. In a very judicious discussion on the origin of the Rio Congo *, the attention of philosophers has been already called to the modifications, which the periods of the risings must undergo in the course of a river, the sources and the mouth of which are not on the same side of the equinoctial line †. The hydraulic systems brated among the Scythians and the Thessalians." As the Tatarian and Mexican zodiacs contain the signs of the *Monkey* and the *Tiger*, they, no doubt, originated in the torrid zone. With the Muyscas, inhabitants of New Grenada, the first sign, as in eastern Asia, was that of *Water*, figured by a *frog*. It is also remarkable, that the astrological worship of the Muyscas came to the tableland of Bogota from the eastern side, from the plains of San Juan, which extend toward the Guaviare and the Oroonoko. See several hieroglyphic paintings in my Amer. Monuments.

* Voyage to the Zaire, p. xvii.
† Among the rivers of America this is the case with the Rio Negro, the Rio Branco, and the Jupura.
of the Oroonoko and the Amazon furnish a combination of circumstances still more extraordinary. They are united by the Rio Negro and the Cassiquiare, a branch of the Oroonoko; it is a navigable line, between two great basins of rivers, that is crossed by the equator. The river Amazon, according to the information which I obtained on its banks, is much less regular in the periods of its oscillations than the Oroonoko; it generally begins however to increase in December, and attains its maximum of height in March*. It sinks from the month of May, and is at its minimum of height in the months of July and August, at the time when the Lower Oroonoko inundates all the surrounding land. As no river of America can cross the equator from south to north, on account of the general configuration of the ground, the risings of the Oroonoko have an influence on the Amazon; but those of the Amazon do not alter the progress of the oscillations of the Oroonoko. It results from these data, that, in the two basins of the Amazon and the Oroonoko, the concave and convex summits of the curve of progressive increase and decrease† correspond very regularly with each other, since they exhibit the dif-

* Nearly seventy or eighty days after our winter solstice, which is the summer solstice of the southern hemisphere.

† Girard, fig. 1, where we find the curve of the rise of the
ference of six months, which results from the situation of the rivers in opposite hemispheres. The commencement of the risings only is less tardy in the Oroonoko. This river increases sensibly as soon as the Sun has crossed the equator; in the Amazon, on the contrary, the risings do not commence till two months after the equinox. It is known, that in the forests north of the line the rains are earlier, than in the less woody plains of the southern torrid zone. To this local cause is joined another, which acts perhaps equally on the tardy swellings of the Nile. The river Amazon receives a great part of its waters from the Cordillera of the Andes, where the seasons, as everywhere among mountains, follow a peculiar type, most frequently opposite to that of the low regions.

The law of the increase and decrease of the Oroonoko is more difficult to determine with Nile. The following are the analogous results for two great rivers of South America compared with the Nile.

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<th>OROONOKO.</th>
<th>AMAZON.</th>
<th>NILE.</th>
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<td>(Lat. 3° to 8° N.)</td>
<td>(Lat. 3° N. to 16°S.)</td>
<td>(Lat. 11° 30′ to 31° 15′ N.)</td>
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<td>the rise ... April.</td>
<td>December.</td>
<td>April (Abyssinia);</td>
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<td>Maximum ... Aug.</td>
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The Oroonoko, like the Nile, increases during 100 or 115 days. The maximum of the Rio del Norte is in May. (Pol. Essay, vol. i, p. 303.)
respect to space, or to the magnitude of the oscillations, than with regard to time, or the period of the maxima and minima. Having been able to measure but imperfectly the risings of the river, I report, not without hesitation, estimates, that differ much from each other*. Foreign pilots admit ninety feet for the ordinary rise in the Lower Oroonoko. Mr. de Pons, who has in general collected very accurate notions during his stay at Caraccas, fixes it at thirteen fathoms. The heights naturally vary according to the breadth of the bed, and the number of tributary streams which the principal trunk receives. The swellings of the Nile in Upper Egypt are from thirty to thirty-five feet; at Cairo twenty-three feet; and in the northern part of the Delta four feet. It appears, that the mean rise at Angostura does not exceed twenty-four or twenty-five feet. In this spot an island, situate in the middle of the river, would furnish the same facility for measuring the increase, as that afforded by the nilometer (Megyas) placed at

* Tuckey, Maritime Geogr., vol. iv, p. 309. Hippisley, Exped. to the Oroonoko, p. 38. Gumilla, vol. i, p. 56—59. Depons, vol. iii, p. 301. The greatest height of the rise of the Mississippi is, at Natchez, fifty-five English feet. This river (the largest perhaps of the whole temperate zone) is at its maximum from February to May; at its minimum in August and September. Ellicot, Journal of an Expedition to the Ohio, p. 120.
the point of the island of Roudah. An eminent scientific gentleman, who has recently resided on the banks of the Oroonoko, Mr. Zea, will supply what is wanting in my observations on a point so important. The people believe, that every twenty-five years the Oroonoko rises three feet higher than common; but the idea of this cycle does not rest on any precise measures. We know by the testimony of antiquity, that the oscillations of the Nile have been sensibly the same with respect to their height and duration for thousands of years; which is a proof well worthy of attention, that the mean state of the humidity and the temperature does not vary in that vast basin. Will this constancy in physical phenomena, this equilibrium of the elements, be preserved in the New World also after some ages of cultivation? I think we may reply in the affirmative; for the united efforts of man cannot have an influence on the general causes, on which the climate of Guyana depends.

According to the barometric height of San Fernando de Apure, I find from that town to the Boca de Navios the slope of the Apure and the Lower Oroonoko to be three inches and a quarter to a nautical mile of nine hundred and fifty toises*. We may be surprised at the strength

* The Apure itself has a slope of thirteen inches to the mile. See vol. iv, p. 455.
of the current in a slope so little perceptible; but I shall remind the reader on this occasion, that, according to measurements made by order of Mr. Hastings, the Ganges was found in a course of sixty miles (comprising the windings) to have also only four inches fall to a mile; and that the mean swiftness of this river is in the seasons of drought three miles an hour, and in those of rains six or eight miles. The strength of the current therefore, in the Ganges as in the Oroonoko, depends less on the slope of the bed, than on the accumulation of the higher waters, caused by the abundance of the rains, and the number of tributary streams*. European colonists have already been settled for two hundred and fifty years on the banks of the Oroonoko; and during this long period of time, according to a tradition which has been propagated from generation to generation, the periodical oscillations of the river (the time of the beginning of the rising, and that when it attains its maximum) have never been retarded more than twelve or fifteen days.

When vessels that draw a good deal of water sail up toward Angostura in the months of January and February, by favour of the seabreeze and the tide, they run the risk of taking the ground. The navigable channel often changes its breadth

* Barrow, in the *Voyage to the Zaire*, Intr., p. xvii.
and direction; no buoy however has yet been laid down, to indicate any deposit of earth formed in the bed of the river, where the waters have lost their original velocity. There exists on the south of Cape Barima, as well by the river of this name as by the Rio Moroca and several esteres*, a communication with the English colony of Essequibo. Small vessels can penetrate into the interior as far as the Rio Poun-
maron †, on which are the ancient settlements of Zealand and Middlebour. Heretofores this communication interested the government of Caraccas only on account of the facility it furnished to an illicit trade; but since Berbice, Demerara, and Essequibo, have fallen into the hands of a more powerful neighbour, it fixes the attention of the Spanish Americans as being connected with the security of their frontiers. Rivers which have a course parallel to the coast, and are no where farther distant from it than five or six nautical miles ‡, characterize the

* Aestuaria, estuaries.
† Near Cape Nassau. Colonel Ynciarte, before he was settled at Angostura, was employed by the Spanish government to make a survey of the labyrinth of channels (esteros y caños) between the great mouth of the Oroonoko and that of the Essequibo. Unfortunately this officer was not furnished with a chronometer.
‡ See for instance, on Mr. Van der Bosch's fine maps, the course of the Commewyne, which joins the river of Surinam at right angles, as the Cayuni joins the Essequibo.
whole of the shore between the Oroonoko and the Amazon.

Ten leagues distant from Cape Barima, the great bed of the Oroonoko is divided for the first time into two branches of two thousand toises in breadth. They are known by the Indian names of Zacupana and Imataca. The first, which is the northernmost, communicates on the west of the islands Congrejos and del Burro with the bocas chicas of Lauran*, Nuina, and Mariusas. As the Isla del Burro disappears in the time of great inundations, it is unhappily not suited to fortifications. The southern bank of the brazo Imataca is cut by a labyrinth of little channels, into which the Rio Imataca and the Rio Aquire† flow. A long series of little granitic hills rises in the fertile savannahs between the Imataca and the Cuyuni; it is a prolongation of the Cordilleras of Parima, which, bounding the horizon south of Angostura, forms the celebrated cataracts of the Rio Caroni, and approaches the Oroonoko like a projecting cape near the little fort of Vieja Guyana. The populous missions of the Caribbee and Guyana Indians, governed by the Catalonian Capuchins, lie near the sources of the Imataca and the Aquire. The easternmost of these missions are those of Mi-

* Canno francès.

† These channels communicate with the Canno de Arecifes, which opens two leagues west of cape Barima.
am, Cumamu, and Palmar, situate in a hilly country, which extends toward Tupuquen, Santa Maria, and the Villa de Upata. Going up the Rio Aquire, and directing your course across the pastures toward the south, you reach the mission of Belem de Tumeremo, and thence the confluence of the Curumu with the Rio Cuyuni, where the Spanish post or _destacamento de Cuyuni_ * was formerly established. I enter into this topographic detail, because the Rio Cuyuni, or Cuduvini, runs parallel to the Oroonoko from west to east, through an extent of 2° 5° or 3° of longitude †, and furnishes an excellent natural boundary between the territory of Caraccas and that of English Guyana.

The two great branches of the Oroonoko, the Zacupana and the Imataca, remain separate for fourteen leagues; on going up farther, the waters of the river are found united ‡ in a single channel extremely broad. This channel is near eight leagues long; at it’s western extremity a second bifurcation appears; and as the summit of the

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* On the east of the mountains of Kinoroto.

† Including the Rio Jurum, one of the principal branches of the Cuyuni. The Dutch military post is five leagues west of the union of the Cuyuni with the Essequebo, where the former of these rivers receives the Mazuruni.

‡ At this point of Union are found two villages of Guarons. They also bear the names of Imataca and Zacupana. See vol. iii, p. 279.
delta is in the northern branch of the bifurcated river, this part of the Oronoko is highly important for the military defence of the country. All the channels*, that terminate in the bocas chicas, rise from the same point of the trunk of the Oronoko. The branch (Cano Manamo) that separates from it near the village of San Rafael has no ramification till after a course of three or four leagues; and by placing a small fort above the island of Chaguanes, Angostura might be defended against an enemy, that should attempt to penetrate by one of the bocas chicas. In my time the station of the gunboats was east of San Rafael, near the northern bank of the Oronoko. This is the point †, which vessels must pass in sailing up toward Angostura by the northern channel, that of San Rafael, which is the broadest but the most shallow.

Six leagues above the point where the Oronoko sends off a branch to the bocas chicas, is

* Canno de Manamo grande, C. de Manamo chico, C. Pedernales, C. Macareo, C. Cutupiti, C. Macuona, C. grande de Mariusas, &c. The last three branches form by their union the sinuous channel called the Vuelta del Torno. Though the labyrinth of these small branches appears to be subject to frequent changes, it is not less certain, that an accurate plan might be taken of the great branches of the Delta of the Oronoko. This labour would no doubt be long; but by rectifying from time to time the soundings marked on it, it would become a great help to the navigation.

† Barancas, near the island of Yaya.
placed an ancient fort (los Castillos de la Vieja or Antigua Guayana), the first construction of which goes back to the sixteenth century. In this spot the bed of the river is studded with rocky islands; and it is asserted, that it's breadth is nearly six hundred and fifty toises. The town is almost destroyed, but the fortifications subsist, and are well worthy the attention of the government of Terra Firma. There is a magnificent view from the battery established on a bluff north-west of the ancient town, which at the period of great inundations is entirely surrounded with water. Pools that communicate with the Oroonoko form natural basins, adapted for the reception of vessels that want repairs. It is to be hoped, that, when peace is restored to those countries, and a narrow policy no longer checks the course of industry, those basins of Vieja Guayana will be surrounded with yards for building vessels. Next to the Amazon, there is no river, which, from the forests through which it flows, can furnish more valuable timber for ship-building. This timber, drawn from the great families of the laurineæ, guttiferæ, rutaceæ, and arborescent legumina, affords all the desir-

* West of the Islas Iguanas.

† Los fuertes de San Francisco de Asis y del Padrasto. I know not whether the remains of the Castillo de San Fernando, or of Limones, still exist opposite Vieja Guayana, on the northern bank.
able varieties of density, specific gravity, and more or less resinous qualities. All that is wanting in this country is a wood fit for masts, light, elastic, and with parallel fibres, such as is furnished by the coniferæ of the temperate regions, and of the lofty mountains of the tropics.

After having passed the little forts of Vieja Guayana, the bed of the Orconoko again widens. The state of cultivation of the country on the two banks affords a striking contrast. On the north is seen the desert part of the province of Cumana, steppes (Llanos) destitute of habitations, and extending beyond the sources of the Rio Mamo, toward the tableland or mesa of Guanipa. On the south we find three populous villages belonging to the missions of Carony, namely, San Miguel de Uriala *, San Felix, and San Joaquin. The last of these villages, situate on the banks of the Carony immediately below the great cataract, is considered as the embarcadero of the Catalanian missions. On navigating more to the east, between the mouth of the Carony and Angostura, the pilot should avoid the rocks of Guarampo, the sandbank of Mamo, and the Piedra del Rosario. From the numerous materials which I brought home, and from astronomical discussions, the principal results of which I have indicated above, I have constructed a map of the

* See above, p. 709.
country bounded by the delta of the Oroonoko, the Carony, and the Cuyuni. This part of Guyana, from it's proximity to the coasts, will some day offer the greatest attraction to European settlers.

The whole population of this vast province in it's present state is, with the exception of a few Spanish parishes *, scattered on the banks of the Lower Oroonoko, and subject to two monastic governments. Estimating the number of the inhabitants of Guyana, who do not live in savage independance, at thirty-five thousand, we find nearly twenty-four thousand settled in the missions, and thus withdrawn as it were from the direct influence of the secular arm. At the period of my voyage, the territory of the monks of the Observance of St. Francis contained seven thousand three hundred inhabitants, and that of the Capuchinos Catalanes seventeen thousand; an astonishing disproportion, when we reflect on the smallness of the latter territory compared to the vast banks of the Upper Orooonoko, the Atabapo, the Cassiquiare, and the Rio Negro. It results from these statements, that nearly two thirds of the population of a province of sixteen thousand eight hundred square leagues are found concentrated between the Rio Imataca and the town of Santo Thomè del Angostura, on a space of ground only fifty-

* Pueblos y villas de Espanoles.
five leagues in length, and thirty in breadth. Both of these monastic governments are equally inaccessible to Whites, and form status in statu. The first, that of the Observantins, I have described from my own observations; it remains for me to record here the notions I could procure respecting the second of these governments, that of the Catalan Capuchins. Fatal civil dissensions, and epidemic fevers, have of late years diminished the long increasing prosperity of the missions of the Carony; but, notwithstanding these losses, the region which we are going to examine is still highly interesting with respect to political economy.

The missions of the Catalan Capuchins, which in 1804 contained at least sixty thousand head of cattle grazing in the savannahs, extend from the eastern banks of the Carony and the Paragua as far as the banks of the Imitaca, the Curumu, and the Cuyuni; at the south-east they border on English Guyana, or the colony of Essequebo; and toward the south, in going up the desert banks of the Paragua and the Paraguamasi, and crossing the Cordillera of Pacaraimo, they touch the Portuguese settlements on the Rio Branco. The whole of this country is open, full of fine savannahs, and no way resembling that through which we passed on the Upper Oroonoko. The forests become impenetrable only on advancing
toward the south; on the north are meadows intersected with woody hills. The most picturesque scenes lie near the falls of the Carony, and in that chain of mountains, two hundred and fifty toises high, which separates the tributary streams of the Oroonoko from those of the Cuyuni. There are situate the Villa de Upata*, the capital of the missions, Santa Maria, and Cupapui. Small tablelands afford a healthy and temperate climate. Cacao, rice, cotton, indigo, and sugar, grow in abundance, wherever a virgin soil, covered with a thick coat of grasses, is subjected to cultivation. The first Christian settlements in those countries are not, I believe, of an earlier date than 1721. The elements of which the present population is composed are the three Indian races of the Guayanoes, the Caribbees, and the Guaycas. The last are a people of mountaineers, and are far from being so diminutive in size as the Guaycas whom we found at Esmeralda†. It is difficult to fix them

* Founded in 1762. Population; 657 souls in 1797; 769 souls in 1803. The most populous villages of these missions, Alta Gracia, Cupapui, Santa Rosa de Cura, and Guri, had between 600 and 900 inhabitants, in 1797; but in 1818 epidemic fevers diminished the population more than a third. In some missions these diseases have swept away nearly half of the inhabitants. See Trip from Angostura to the Capuchin Missions of the Caroni, in the Jour. of the Royal Instit., 1820, No. 16, p. 260—287, and No. 17, p. 1-132.

† See above, p. 565.
to the soil; and the three most modern missions in which they have been collected, those of Cura, Curucuy, and Arechica, are already destroyed. The Guayanoes, who early in the sixteenth century gave their name to the whole of that vast province, are less intelligent, but milder, and more easy, if not to civilize, at least to subjugate, than the Caribbees. Their language appears to belong to the great branch of the Caribbee and Tamanac tongues. It displays the same analogies of roots and grammatical forms, which is observed between the Sanskrit, the Persian, the Greek, and the German. It is not easy to fix the forms of what is indefinite by it's nature; and to agree on the differences, which should be admitted between dialects, derivative languages, and mother tongues. The Jesuits of Paraguay have made known to us another tribe of Guayanoes* in the southern hemisphere, living in the thick forests of Parana. Though it cannot be denied in general, that, in consequence of distant migrations†, the nations that are settled north and south of the Amazon have had communications with each other, I will not decide, whether the Guayanoes of Parana and of Uruguay exhibit any other relation

* They are also called Guamanas, or Gualachas. (See Azara, Voyage to Paraguay, vol. ii, p. 221.)
† Like the celebrated migrations of the Om-aguas, or Omeguas.
to those of Carony, than that of an homonymy, which is perhaps only accidental*.

The most considerable Christian settlements are now concentrated between the mountains of Santa Maria, the mission of San Miguel, and the eastern bank of the Carony, from San Buenaventura as far as Guri† and the embarcadero of San Joaquin; a space of ground which has not more than four hundred and sixty square leagues of surface. The savannahs to the east and the south are almost uninhabited; we find there only the solitary missions of Belem, Tumuremo, Tupuquen, Puedpa, and Santa Clara. It were to be wished, that the spots preferred for cultivation were distant from the rivers, where the land is higher, and the air more favorable to health. The Rio Carony, the waters of which, of an admirable clearness, are not well stocked with fish, is free from shoals from the Villa de Barceloneta, a little above the confluence of the Paragua, as far as the village of Guri. Farther north it winds between innumerable islands and rocks; and the small boats of the Caribbees

* Beside the Caribbees, the Guayanoes, and the Guaycas, there are also, in the missions of Carony, Pariagotoes, Guaruanoes, and Aruacas. See on these different races, vol. iii, p. 275 and 287.

† Euri, in the map inserted in the Journal of the Royal Institution, No. 17. The village of Rosario de Guacipati is called in that map Wasipati.
only venture to navigate amid these *raudales*, or rapids of the Carony. Happily the river is often divided into several branches; and consequently that can be chosen, which according to the height of the waters presents the fewest whirlpools and shoals. The great *Salto*, celebrated for the picturesque beauty of it's situation, is a little above the village of Aguacaqua, or Carony, which in my time had a population of seven hundred Indians. This cascade is said to be from fifteen to twenty feet high; but the bar does not cross the whole bed of the river, which is more than three hundred feet broad. When the population is more extended toward the east, it will avail itself of the course of the small rivers Imataca and Aquire, the navigation of which is pretty free from danger. The monks, who like to keep themselves isolated, in order to withdraw from the eye of the secular power, have been hitherto unwilling to settle on the banks of the Oroonoko. It is however by this river only, or by the Cuyuni and the Essequibo, that the missions of Carony can export their productions. The latter way has not yet been tried, though several Christian settlements* are formed.

* Guacipati, Tupuquen, Angel de la Custodia, and Cura, where the military post of the frontiers was stationed in 1800, which had been anciently placed at the confluence of the Cuyuni and the Curumu.
on one of the principal tributary streams of the Cuyuni, the Rio Juruario*. This stream furnishes at the period of the great swellings the remarkable phenomenon of a bifurcation. It communicates by the Juraricuima and the Aurapa with the Rio Carony†; so that the land comprised between the Oroonoko, the sea, the Cuyuni, and the Carony, becomes a real island. Formidable rapids impede the navigation of the Upper Cuyuni; and hence of late an attempt has been made, to open a road to the colony of Essequebo much more to the south-east, in order to fall in with the Cuyuni much below the mouth of the Curumu.

The whole of this southern territory is traversed by hordes of independant Caribbees; the feeble remains of that warlike people, who were so formidable to the missionaries till 1733 and 1735, at which period the respectable bishop Gervais de Labrid‡, canon of the metropolitan chapter of Lyon, father Lopez, and several other ecclesiastics, perished by the hands of the Caribbees. These dangers, too frequent formerly,

* Rio Yuarnare of the English map which I have just quoted.
† Caulin, p. 57 and 61.
‡ Consecrated a bishop for the four parts of the world (obispo para las cuatro partes del mundo) by pope Benedict the 13th.
exist no longer, either in the missions of Carony, or in those of the Oroonoko; but the independant Caribbees continue, on account of their connection with the Dutch colonists of Essequibo, an object of mistrust and hatred to the government of Guyana. These tribes favor the contraband trade along the coast, and by the channels or estuaries, that join the Rio Barima to the Rio Moroca; they carry off the cattle belonging to the missionaries, and excite the Indians recently converted, and living within the sound of the bell, to return to the forests. The free hordes have every where a powerful interest in opposing the progress of cultivation, and the encroachments of the Whites. The Caribbees and the Aruacas procure firearms at Essequibo and Demerara; and, when the traffic of American slaves (poitos) was most active, adventurers of Dutch origin took part in these incursions on the Paragua, the Erevato, and the Ventuario. Men-hunting took place on these banks, as heretofore (and probably still) on those of the Senegal and the Gambia. In both worlds Europeans have employed the same artifices, and committed the same atrocities, to maintain a trade that dishonours humanity. The missionaries of the Carony and the Oroonoko attribute all the evils they suffer from the independent Caribbees to the hatred of their neighbours, the Calvinist preachers of Essequi-
bo. Their works are therefore filled with complaints* of the secta diabolica de Calvino y de Lutero, and against the heretics of Dutch Guyana, who also think fit sometimes to go on missions, and spread the germe of social life among the savages.

Of all the vegetable productions of those countries, that which the industry of the Catalonian Capuchins has rendered the most celebrated is the tree, that furnishes the cortex Angosturae, which is erroneously designated by the name of cinchona of Carony. We were fortunate enough to make it first known as a new genus distinct from the cinchona, and belonging to the family of meliaceae, or of zanthoxylus†. This

† See our Equin. Plants, vol. i, p. 61, pl. 89. Willdenow, in the Mémoires de l' Académie de Berlin, 1802, p. 24. De Candolle, Propriétés des Plantes, p. 93. Richard, in the Mém de l' Institut, 1811, P. i, p. 82, Pl. 10. Beside the ticorea of Aublet, there is reason to believe a second species of the genus bonplandia, the real bonplandia trifoliata, also grows in French Guyana. Mr. Kunth recognized it among the plants of Cayenne sent home by Mr. Martin. At Guayaquil I had inscribed the bonplandia in my Table of the Geography of Plants, under the provisional name of cusparia febrifuga; this name, which has by mistake remained on the plate published after my return to Europe, has been copied into many works on the materia medica. The bonplandia of Cavanilles is a Mexican plant, to which we have given the name of caldasia geminiflora, and which is become common in our gardens. (Willd.,
salutary drug of South America was formerly attributed to the brucea ferruginea, which grows in Abyssinia, to the magnolia glauca, and to the magnolia plumieri. During the dangerous disease of Mr. Bonpland, Mr. Ravago sent a confidential person to the missions of Carony, to procure for us, by favor of the Capuchins of Upata, branches of the tree in flower, which we wished to be able to describe. We obtained very fine specimens, the leaves of which, eighteen inches long, diffused an agreeable aromatic smell. We soon perceived, that the cuspare (the indigenous name of the cascarilla or corteza del Angostura) forms a new genus; and on sending the plants of the Oroonoko to Mr. Willdenow, I begged he would dedicate this plant to Mr. Bonpland. The tree, known at present by the name of bonplandia trifoliata, grows at the distance of five or six leagues from the eastern bank of the Carony, at the foot of the hills that surround the missions Capapui, Upata, and Alta Gracia. The Caribbee Indians make use

Hortus Berol., vol. i, p. 71.) The abbé Cavanilles, in dedicating this genus of the family of the polemoniaceous plants to Mr. Bonpland, had no knowledge of the memoir on the cortex Angostura, which Mr. Willdenow had presented to the Academy of Berlin. The term angostura as a generic name is altogether inadmissible. Would a plant be named roma, which, without growing in the vicinity of that city, had become an article of trade among the Romans?
of an infusion of the bark of the *cuspare*, which they consider as a strengthening remedy. Mr. Bonpland discovered the same tree west of Cumaná, in the gulf of Santa Fe, where it may become one of the articles of exportation from New Andalusia.

The Catalanion monks prepare an extract of the cortex *angosturae*, which they send to the convents of their province, and which deserves to be better known in the north of Europe. It is to be hoped, that the febrifuge and antidysenteric bark of the *bonplandia* will continue to be employed, notwithstanding the introduction of another described by the name of *false Angostura bark*; and often confounded with the former. This *false Angostura*, or *Angostura pseudoferruginea*, comes, it is said, from the *brucea antidysenterica*; it acts powerfully on the nerves *, produces violent attacks of tetanos, and contains, according to the experiments of Pelletier and Caventon, a peculiar alkaline substance † analogous to morphin and strychnin.

* According to the experiments of Emmert, Marc, and Orfila.

† *La brucine*. Mr. Pelletier has wisely avoided using the word *angosturine*, because it might indicate a substance taken from the real cortex *angosture*, or *bonplandia trifoliata*. (*Annales de Chimie*, vol. xii, p. 117.) We saw at Peru the barks of two new species of *weinmannia* and *wintera* mixed with those of *cinchona*; a mixture less dangerous, but still inju-
As the tree which yields the real *cortex Angosturae* does not grow in great abundance, it is to be wished, that plantations of it were formed. The Catalanian monks are well fitted to spread this kind of cultivation; they are more economical, industrious, and active, than the other missionaries. They have already established tannyards and cotton spinning in a few villages*; and if they suffer the Indians henceforth to enjoy the fruit of their labors, they will find great resources in the native population. Concentred on a small space of land, these monks have the consciousness of their political importance, and have from time to time resisted the civil authority, and that of their bishop. The governors who reside at Angostura have struggled against them with very unequal success, according as the ministry of Madrid showed a complaisant deference for the ecclesiastical hierarchy, or sought to limit it's power. In 1768 don Manuel Centurion carried off twenty thousand head of cattle from the missionaries, in order to distribute them among the indigent inhabitants. This liberality, exerted in a manner not very legal, produced very serious consequences. The governor was disgraced on the complaint of the Catalanian monks, though he had considerably extended

rious, on account of the superabundance of tannin and acrid matter contained in the false *cascarillas*.

* At Miamo, Tumeremo, &c.
the territory of the missions toward the south, and founded the *villa de Barceloneta, above the confluence of the Carony with the Rio Paragua, and the *Ciudad de Guirior, near the union of the Rio Paragua and the Paraguamusi. From that period till the political troubles, which now agitate the Spanish colonies, the civil administration has carefully avoided all intervention in the affairs of the Capuchins; whose opulence has been exaggerated, like that of the Jesuits of Paraguay.

The missions of the Carony, by the configuration of their soil * and the mixture of savannahs and arable lands, unite the advantages of the Llanos of Calabozo and the vallies of Aragua. The real wealth of this country is founded on the care of the herds, and the cultivation of colonial produce. It were to be wished, that here, as in the fine and fertile province of Venezuela, the inhabitants, faithful to the labours of the fields, would not addict themselves too hastily to the research of mines. The example of Germany and Mexico prove no doubt, that the working of metals is not at all incompatible with a flourishing state of agriculture; but, according to popular traditions, the banks of the Carony lead to the lake Dorado, and the

* It appears, that the little table-lands between the mountains of Upata, Cumamu, and Tupuquen, are more than one hundred and fifty toises above the level of the sea.
palace of the \textit{gilded man*}; and this lake, and this palace, being a \textit{local fable}, it might be dangerous to awaken remembrances, which begin gradually to be effaced. I was assured, that in 1760 the independent Caribbees went to \textit{Cerro de Pajarcima}, a mountain to the south of \textit{Vieja Guayana}, to submit the decomposed rock to the action of washing. The gold dust collected by this labour was put into calebashes of \textit{crescentia cujete}, and sold to the Dutch at Essequibo. Still more recently, some Mexican miners, who abused the credulity of Don Jose Avalo\textsuperscript{†} the intendant of Caraccas, undertook a very considerable work in the centre of the missions of the Rio Carony, near the town of Upata, in the \textit{Cerros del Potrero} and \textit{de Chirica}. They declared, that the whole rock was auriferous; stamping-mills, \textit{brocards}, and smelting furnaces were constructed. After having expended very large sums, it was discovered, that the pyrites contained no trace whatever of gold. These essays, though fruitless, served to renew the ancient idea\textsuperscript{‡}, "that every shining rock in Guyana is \textit{una madre del oro}.” Not contented with taking the mica-slate to the furnace, strata

\textsuperscript{*} \textit{El Dorado}, that is, \textit{el rey o' hombre dorado}. See above, p. 390.

\textsuperscript{†} See above, vol. iii, p. 531.

\textsuperscript{‡} \textit{Raleigh}, Discovery of the Empire of Guiana, p. 2 and 34.
of *amphibolic slates* were shown to me near Angostura, without any mixture of heterogeneous substances, which had been worked under the whimsical name of black ore of gold, *oro negro*.

This is the place to make known, in order to complete the description of the Oroonoko, the principal results of my researches on *el Dorado*, the White Sea, or Laguna Parime, and the sources of the Oroonoko, as they are marked in the most recent maps. The idea of an auriferous earth, eminently rich, has been connected, ever since the end of the 16th century, with that of a great inland lake, which furnishes at the same time waters to the Oroonoko, the Rio Branco, and the Rio Essequibo. I believe, from a more accurate knowledge of the country, a long and laborious study of the Spanish authors who treat of *el Dorado*, and above all from comparing a great number of ancient maps arranged in chronological order, I have succeeded in discovering the source of these errors. All fables have some real foundation; that of *Dorado* resembles those *mythoi* of antiquity, which, travelling from country to country, have been successively adapted to different localities. In the sciences, in order to distinguish truth from error, it often suffices to retrace the history of opinions, and to follow their successive developments. The discussion to which I shall devote the end of this chapter is important, not only because it
throws light on the events of the conquest, and that long series of disastrous expeditions made in search of Dorado, the last of which (I am ashamed to say) was in the year 1775; it also furnishes, in addition to this simply historical interest, another more substantial, and more generally felt, that of rectifying the geography of South America, and of disembarassing the maps published in our days of those great lakes, and that strange labyrinth of rivers, placed as if by chance between sixty and sixty-six degrees of longitude. No man in Europe believes any longer in the wealth of Guyana, and the empire of the grand Patiti. The town of Manoa, and it's palaces covered with plates of massy gold, have long since disappeared; but the geographical apparatus serving to adorn the fable of Dorado, the lake Parima, which, similar to the lake of Mexico, reflected the image of so many sumptuous edifices, has been religiously preserved by geographers. In the space of three centuries the same traditions have been differently modified; from ignorance of the American languages, rivers have been taken for lakes, and portages for branches of rivers; one lake, the Cassipa, has been made to advance five degrees of latitude toward the south, while another, the Parima or Dorado, has been transported the distance of a hundred leagues, from the western to the eastern bank of the Rio
Branco. From these various changes, the problem we are going to solve has become much more complicated, than is generally supposed. The number of geographers, who discuss the basis of a map, with regard to the three points of measures, of the comparison of descriptive works, and of the etymological study* of names,

* I use this expression, perhaps an improper one, to mark a species of philological examination, to which the names of rivers, lakes, mountains, and tribes, must be subjected, in order to discover their identity in a great number of maps. The apparent diversity of names arises partly from the difference of the dialects spoken by one and the same family of people, partly from the imperfection of our European orthography, and from the extreme negligence with which geographers copy one another. We recognize with difficulty the Rio Uaupe in the Guapue or Guape; the Xië, in the Guacia; the Raudal d'Atures, in Athule; the Caribbees, in the Calinas and Galibis; the Guaraunos, or Uarau, in the Waraw-ites; &c. It is however by similar mutations of letters, that the Spaniards have made hijo of filius; hambre, of fames; and Felipo de Urre, and even Utre, of the Conquistador Philip von Hutten; that the Tamanacs in America have substituted choraro for soldado; and the Jews in China, Jalemeiohang for Jeremiah. (See above, vol. iii, p. 254—257, 276, 277, 280; and vol. iv, p. 340 and 479.) Analogy and a certain etymological tact must guide geographers in researches of this kind, in which they would be exposed to serious errors, if they were not to study at the same time the respective situations of the upper and lower tributary streams of the same river. Our maps of America are overloaded with names, for which rivers have been created; as, in the catalogues of organic beings called Systema Naturae, a plant,
is extremely small. Almost all the maps of South America, which have appeared since the year 1775, are, in what regards the interior of the country comprised between the steppes of Venezuela and the river of the Amazons, between the eastern back of the Andes and the

or an animal, which has been described under different names, is indicated as two or three distinct species. This desire of compiling, of filling up vacancies, and of employing without investigation heterogeneous materials, has given our maps of countries the least visited an appearance of exactness, the falsity of which is discovered, when we arrive on the spot. Mr. de la Condamine has made the same observation: "the maps of Guyana," says he, "swarm with details as false as they are circumstantial." (Voyage à l'Amazon, p. 189.) While I indicate in the text the three principal foundations of geographical labours, I carefully distinguish the discussion of measures (that is, astronomical observations, and geodesic and itinerary operations) from the study which is necessary of voyages, of the descriptions of provinces, and of ancient and modern maps. If every country were trigonometrically surveyed, the construction of maps would be reduced to a mechanical operation. The sagacity of the geographer is exerted on what is doubtful; and in our days sound criticism must be necessarily founded on two distinct branches of knowledge, on the discussion of the relative value of the astronomical methods employed, and on the study of descriptive works (travels, statistical tracts, and histories of conquests) in the languages in which their authors have written. This study of the originals is so much the more indispensable, because in most descriptive works (as D'Anville has already judiciously observed) the maps annexed are in many points in direct contradiction with the text.
coast of Cayenne, a simple copy of the great Spanish map of La Cruz Olmedilla. A line, indicating the extent of country which Don Jose Solano boasted of having discovered and pacified by his troops and emissaries, was taken for the road followed by that officer, who never went beyond San Fernando de Atabapo, a village one hundred and sixty leagues distant from the pretended lake Parima. The study of the work of father Caulin, who was the historiographer of the expedition of Solano, and who states very clearly, from the testimony of the Indians, "how the name of the river Parima gave rise to the fable of Dorado, and of an inland sea," has been neglected. No use either has been made of a map of the Oroonoko, three years posterior to that of La Cruz, and traced by Surville from the collection of true or hypothetical materials preserved in the archives of the Despacho universal de Indias. The progress of geography, as manifested on our maps, is much slower than might be supposed from the number of useful results, which are found scattered in the works of different nations. Astronomical observations and topographic information accumulate during a long lapse of years, without being made use of; and from a principle of stability and preservation, in other respects praiseworthy, those who construct maps often choose rather to add nothing, than to sacrifice a lake, a chain of moun-
tains, or an interbranching of rivers, which have figured there during ages.

The fabulous traditions of Dorado and the lake Parima having been diversely modified according to the aspect of the countries to which they were to be adapted, we must distinguish what they contain that is real from what is merely imaginary. To avoid entering here into minute particulars, which will find a more proper place in the Analysis of the Geographical Atlas, I shall begin first to call the attention of the reader to those spots, which have been at various periods the theatre of the expeditions undertaken for the discovery of Dorado. When we have learnt to know the aspect of the country, and the local circumstances, such as they can now be described, it will be easy to conceive, how the different hypotheses recorded on our maps have taken rise by degrees, and have modified each other. To oppose an error, it is sufficient to recall to mind the variable forms, in which we have seen it appear at different periods.

Till the middle of the 18th century, all the vast space of land comprised between the mountains of French Guyana and the forests of the Upper Oroonoko, between the sources of the Carony and the river of Amazons (from 0° to 4° of north latitude, and from 57° to 68° of longitude), was so little known, that geographers could place in it lakes where they pleased, create
communications between rivers, and figure chains of mountains more or less lofty. They have made full use of this liberty; and the situation of lakes, as well as the course and branchings of rivers, has been varied in so many ways, that it would not be surprising, if among the great number of maps some were found, that trace the real state of things. The field of hypotheses is now singularly narrowed. I have determined the longitude of Esmeralda in the Upper Oroonoko; more to the east, amid the plains of Parima (a land as unknown as Wangara and Dar-Saley in Africa), a band of twenty leagues broad has been travelled over from north to south, along the banks of the Rio Carony and the Rio Branco, in the longitude of sixty-three degrees. This is the perilous road, which was taken by don Antonio Santos in going from Santo Thomé del Angostura to Rio Negro and the Amazon; by this road also the colonists of Surinam communicated very recently with the inhabitants of Grand Para*. This road divides the *terra incognita* of Parima into two unequal portions; and fixes limits at the same time to the sources of the Oroonoko, which it is no longer possible to carry back indefinitely toward the east, without supposing that the bed of the Rio Branco, which flows from north to south, is

* See above, p. 460.
crossed by the bed of the Upper Oroonoko, which flows from east to west. If we follow the course of the Rio Branco, or that stripe of cultivated land, which is dependent on the Capitania General of Grand Para, we see lakes, partly imaginary, and partly enlarged by geographers, forming two distinct groups. The first of these groups includes the lakes, which they place between the Esmeralda and the Rio Branco; and to the second belong those, that are supposed to lie between the Rio Branco and the mountains of Dutch and French Guyana. It results from this sketch, that the question, whether there exists a lake Parima on the east of the Rio Branco, is altogether foreign to the problem of the sources of the Oroonoko.

Beside the country which we have just noticed (the Dorado de la Parime, traversed by the Rio Branco), another part of America is found, two hundred and sixty leagues toward the west, near the eastern back of the Cordillera of the Andes, equally celebrated in the expeditions to Dorado. This is the Mesopotamia between the Caqueta, the Rio Negro, the Uaupes, and the Jurubesh, of which I have given a particular account above *: it is the Dorado of the Omaguas, which contains the lake Manoa of Father Acunha, the Laguna de Oro of the Guanes, and the auri-

* In the present vol., p. 311, 319, 340.
ferous land, whence Father Fritz received plates of beaten gold in his mission on the Amazon, toward the end of the seventeenth century.

The first, and above all the most celebrated enterprises attempted in search of *El Dorado* were directed toward the eastern back of the Andes of New Grenada. Fired with the ideas, which an Indian of Tacunga had given of the wealth of the king or Zaque of Cundirumaca *, Sebastien de Belalcazar, in 1535, sent his captains Anasco and Ampudia, to discover the valley of Dorado† twelve days journey from Guallabamba, consequently in the mountains between Pasto and Popayan. The information which Pedro de Anasco had obtained from the natives, joined to that which was received subsequently (1536) by Diaz de Pineda, who had discovered the provinces of Quixos and Canela, between the Rio Napo and the Rio Pastaca, gave

* Herera Dec. V, Lib. 7, cap. 14,(vol. iii, p. 178). Is it not rather the true ancient name of New, Grenada, which other writers on the Conquest call Cundinamarca? It is however the last form, which has been revived in our days, in the war of the independance of the colonies.

birth to the idea, that on the east of the Nevados of Tunguragua, Cayambe, and Popayan, "were vast plains, abounding in precious metals, and where the inhabitants were covered with armour of massy gold." Gonzalo Pizarro, in searching for these treasures, discovered accidentally, in 1539, the cinnamon-trees of America (laurus cinnamomoides, Mut.); and Francisco de Orellana went down the Napo, to reach the river of Amazons. Since that period expeditions were undertaken at the same time from Venezuela, New Grenada, Quito, Peru, and even from Brazil and the Rio de la Plata*, for the conquest of Dorado. Those, of which the remembrance have been best preserved, and which have most contributed to spread the fable of the riches of the Manaos, the Omaguas, and the Guaypes, as well as the existence of the Lagunas de oro, and the town of the Gilded King (Grand Patiti, Grand Moxo, Grand Paru, or Enim), are the incursions made to the south of the Guaviare, the Rio Fragua, and the Caqueta. Orellana, having found idols of massy gold, had fixed men's ideas on an auriferous land between the Papa-mene and the Guaviare. His narrative, and those of the voyages of Jorge de Espira (George

* Nuflo de Chaves went from the Ciudad de la Asuncion, situate on the Rio Paraguay, to discover, in the latitude of 24° south, the vast empire of Dorado, which was every where supposed to be on the eastern back of the Andes.
von Speier), Hernan Perez de Quesada, and Felipe de Urre (Philip von Huten), undertaken in 1536, 1542, and 1545, furnish, amid much exaggeration, proofs of very exact local knowledge*. When these are examined merely in a geographical point of view, we perceive the constant desire of the first conquistadores, to reach the land comprised between the sources of the Rio Negro, of the Uaupès (Guape), and of the Jupura, or Caqueta. This is the land, which, in order to distinguish it from the Dorado de la Parime, we have called above the Dorado des Omaguas†. No doubt the whole country between the Amazon and the Oroonoko was vaguely known by the name of Provincias del Dorado‡; but in this vast extent of forests, savannahs, and mountains, the progress of those who sought the great lake with auriferous banks, and the town of the Gilded King, was directed toward two points only, on the north-east and south-west of the Rio Negro; that is to Parima

* We may be surprised to see, that the expedition of Huten is passed over in absolute silence by Herera. (Dec. 7, lib. 10, cap. vii, vol. iv, p. 238). Fray Pedro Simon gives the whole particulars of it, true or fabulous; but he composed his work from materials, that were unknown to Herera. (See above, p. 324.)

† In 1560 Pedro de Ursua even took the title of Governo- dor del Dorado y de Omagua. (Fray Pedro Simon, vol. vi, chap. x, p. 430.)

‡ Herera, Dec. 5, lib. 9, cap. vi (vol. iii, p. 211).
(or the isthmus between the Carony, the Essequibo, and the Rio Branco), and to the ancient abode of the Manaos, the inhabitants of the banks of the Jurubesh. I have just mentioned the situation of the latter spot, which is celebrated in the history of the conquest from 1535 to 1560; and it remains for me to speak of the configuration of the country between the Spanish missions of the Rio Carony, and the Portuguese missions of the Rio Branco or Parima. This is the country lying near the Lower Oroonoko, the Esmeralda, and French and Dutch Guyana, on which, since the end of the sixteenth century, the enterprises and exaggerated narratives of Raleigh have shed so bright a splendour.

From the general disposition of the course of the Oroonoko, directed successively toward the west, the north, and the east, its mouth lies almost in the same meridian as its sources*: so that by proceeding from Vieja Guyana to the south the traveller passes through the whole of

* The difference does not probably exceed 3° of longitude. The Raudal of Guatharibos, east of Esmeralda, is in the longitude of 67° 38'. I believe consequently, that the sources of the Oroonoko are a little more to the east than the meridian of Santo Thomè del Augostura, which, according to my observation, is in 66° 15' 21". It results from the whole of my discussions on the astronomical geography of Guyana, that Vieja Guayana (long. 64° 43') and the confluence of the Rio Branco with the Rio Negro (long. 64° 34') do not sensibly differ in meridian.
the country, in which geographers have successively placed an inland sea \((\textit{Mar Blanco})\), and the different lakes which are connected with the fable of \textit{el Dorado de la Parime}. We find first the Rio Carony, which is formed by the union \(^*\) of two branches of almost equal magnitude, the Carony, properly so called, and the Rio \textit{Paragua}. The missionaries of Piritu call the latter river a lake \((\textit{laguna})\): it is full of shoals, and little cascades; but, "passing through a country entirely flat, it is subject at the same time to great inundations, and it's real bed \((\textit{su verdadera caxa})\) can scarcely be discovered \(\dagger\)." The natives have given it the name of \textit{Paragua} or \textit{Parava} \(\ddagger\), which means in the Caribbee language \textit{sea}, or \textit{great lake}. These local circumstances and this denomination no doubt have given rise to the idea of transforming the Rio Paragua, a tributary stream of the Carony, into a lake called \textit{Cassipa}, on account of the Cassipagotoes \(\S\), who lived in those coun-

\(^*\) Near the mission of San Pedro de las Bocas (between San Sebastian de Abaratayme and Santa Magdalena de Curucay), six leagues north-east of the Villa de Barceloneta.

\(\dagger\) Caulin, p. 60. These observations of the author of the Corografía are so much the more remarkable, as he was entirely ignorant of the existence of a lake Cassipa on our maps.

\(\ddagger\) Gili, vol. i, p. 323.

\(\S\) Raleigh, p. 64, 69. I always quote, when the contrary is not expressly said, the original edition of 1596. Have these tribes of Cassipagotoes, Epuremei, and Orinoqueponi, so often mentioned by Raleigh, disappeared? or did some
tries. Raleigh gives this basin forty miles in breadth; and, as all the lakes of Parima must have auriferous sands, he does not fail to assert, that in summer, when the waters retire, pieces of gold of considerable weight are found there.

The sources of the tributary streams of the Carony, the Arui, and the Caura (Caroli, Arvi, and Caora *, of the ancient geographers) being very near each other †, this suggested the idea of making all these rivers take their rise from the pretended lake Cassipa ‡. Sanson has so

misapprehension give rise to these denominations? I am surprised to find the Indian words (of one of the different Caribbee dialects?) Ezrabeta cassipuna aquerewana, translated by Raleigh, "the great princes or greatest commander." Since acarwana certainly signifies a chief, or any person who commands (Raleigh, p. 6 and 7), cassipuna perhaps means great, and lake Cassipa is synonymous with great lake. In the same manner Cass-iquire may be a great river, for iquire, like veni, is, on the north of the Amazon, a termination common to all rivers. Goto, however, in Cassipa-goto, is a Caribbee term denoting a tribe. See above, p. 402.

* D'Anville names the Rio Caura, Coari; and the Rio Arui, Aroay. I have not been able hitherto to guess what is meant by the Aloica (Atoca, Atoka of Raleigh), which issues from the lake Cassipa, between the Caura and the Arui.

† See above, p. 582, 684, 689.

‡ Raleigh makes only the Carony and the Arui issue from it (Hondius, Nieuwe Caerte van het wonderbare landt Guiana besocht door Sir Water Ralegh, 1594-1596); but in posterior maps, for instance that of Sanson, the Rio Caura issues also from lake Cassipa.
much enlarged this lake, that he gives it forty-two leagues in length, and fifteen in breadth*. The ancient geographers placed opposite to each other, with very little hesitation, the tributary streams of the two banks of a river; and they place the mouth of the Carony, and lake Cassipa, which communicates by the Carony with the river Oroonoko, sometimes † above the confluence of the Meta. Thus it is carried back by Hondius as far as the latitudes of 2° and 3°, giving it the form of a rectangle, the longest sides of which run from north to south. This circumstance is worthy of remark, because, in assigning gradually a more southern latitude to the lake Cassipa, it has been detached from the Carony and the Arui, and has taken the name of Parima. To follow this metamorphosis in its progressive development, we must compare the maps which have appeared since the voyage of Raleigh till now. La Cruz, who has been copied by all the modern geographers, has preserved the oblong form of the lake Cassipa for his lake Parima, although this form is entirely different from that of the ancient lake Parima, or Ropunuwini, of which the great axis was directed from east to west. The ancient lake

* Map of Terra Firma, 1656.
† Sanson, Map for the voyage of Acunha, 1680. Id. South America, 1659. Coronelli, Indes occidentales, 1689.
(that of Hondius, Sanson, and Coronelli) was also surrounded by mountains, and gave birth to no river, while the lake Parima of La Cruz and the modern geographers communicates with the Upper Oroonoko, as the Cassipa with the Lower Oroonoko.

I have stated the origin of the fable of the lake Cassipa, and the influence it has had on the opinion, that the lake Parima is the source of the Oroonoko. Let us now examine what relates to this latter basin, this pretended interior sea, called Rupunuwini by the geographers of the sixteenth century. In the latitude of four degrees or four degrees and a half, (in which direction unfortunately, south of Santo Thomé del Angostura to the extent of eight degrees, no astronomical observation has been made) is a long

* Those geographers, who have effaced the ancient lake Parima from their maps, for instance Sanson (River of the Amazons, 1680), de Lisle (Amér. Mérid. 1700), d'Anville, in the first edition of l'Amérique méridionale, and Robert de Vaugondi (Nouveau Monde, 1778), have religiously preserved a lake Cassipa, the source of the Carony and the Arui. D'Anville, in the second edition of his map, indicates at the same time both the lakes Cassipa and Parima. La Cruz was too well informed by the accounts of the missionaries respecting the sources of the Caura, not to omit the Cassipa.

† If a line be drawn (west of Cayenne) through the falls of the Maroni and the Essequibo, Vieja Guayana, and the right bank of the Oroonoko, to Esmerald, and thence through the confluence of the Rio Branco with the Rio Negro, along the latter river as far as Vistoza (on the left bank of the Amazon), and to the sources of the Oyapok, we shall have
and narrow Cordillera, that of Pacaraimo, Quimiropaca, and Ucucuamo; which, stretching from east to south-west, unites the group of mountains of Parima to the mountains of Dutch and French Guyana. It divides its waters between the Carony, the Rupunury or Rupunuwini, and the Rio Branco; and consequently between the vallies of the Lower Oróonoko, the Essequibo, and the Rio Negro*. On the north-west of the Cordillera de Pacaraimo, which has been traversed but by a small number of Europeans (by the German surgeon, Nicolas Hörtmann, in 1739; by a Spanish officer, Don Antonio Santos, in 1775; by the Portugueze colonel, Barata, in 1791; and by several Eng-

an area of 48,000 square leagues, in which not a single situation has been astronomically determined. This country lies between the missions of the Oróonoko, and French and Dutch Guyana. Thus also west of the missions of the Oróonoko, between the Atabapo and the eastern back of the Andes, there are 25,000 square leagues destitute of points astronomically determined. The geographer, who would ground a map of South America on observations of latitude and longitude, finds on the north of the Amazon a terra incognita three times as big as Spain. The places which I determined astronomically between San Fernando de Apure, Javita, San Carlos del Rio Negro, and Santo Thomas del Angostura, that is, between 1° 53' and 8° 8' of latitude, and 66° 15' and 79° 20' of longitude, are very advantageously situate, since they divide this vast extent of land into two parts, and furnish fixed points on the east and west of the Oróonoko.

* See above, p. 481, 576.
lish settlers, in 1811), descend the Noeapra, the Paraguamusi, and the Paragua, which fall into the Rio Carony: on the north-east, the Rupunuwini, a tributary stream of the Rio Essequibo. Toward the south, the Tacutu and the Urariquera form together the famous Rio Parima, or Rio Branco *.

This isthmus, between the branches of the Rio Essequibo and the Rio Branco (that is, between the Rupunuwini on one side, and the Pirara, the Mahu, and the Ururicuera or Rio Parima on the other), may be considered as the classical soil of the Dorado of Parima. The rivers at the foot of the mountains of Pacaraimo are subject to frequent overflowings. Above Santa Rosa, the right bank of the Urariapara, a tributary stream of the Ururicuera †, is called el Valle de

* It would be equally well founded to assume, that the Rio Branco rises from the union of the Mahu (Mao) and the Rio Parima properly so called; for the Tacutu receives the waters of the Mahu, and the Ururiquera those of the Rio Parima. When several branches of almost equal magnitude unite, the natives, as well as geographers, vary in the denomination of the new river, which rises from this junction.

† Curaricara, in the journals of don Antonio Santos and don Nicolas Rodriguez, of which I am in possession. These travellers, crossing the Cordillera of Quimipacapa, and passing by Santa Rosa, went from the Nocapraí, a tributary stream of the Paraguamusi, to the Urariapara; and thence descended toward the Portugueze fortress of San Joaquim, situate at the confluence of the Ururicuera and the Tacutu.
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la Inundacion. Great pools also are found between the Rio Parima and the Xurumu. These are marked on the maps recently constructed in Brazil, which furnish the most ample details of those countries. More to the west, the Canno Pirara, a tributary stream of the Mahu, issues from a lake covered with rushes. This is the lake Amucu described Nicolas Hortsmann; and respecting which some Portugueze of Barcelos, who had visited the Rio Branco (Rio Parima or Rio Paravigiana *) gave me precise notions during my stay at San Carlos del Rio Negro. The lake Amucu is several leagues broad, and contains two small islands, which Santos heard called Islas Ipomucena. The Rupunuwini (Rupunury), on the banks of which Hortsmann discovered rocks covered with hieroglyphical figures†, approaches very near this lake, but does not communicate with it. The portage between the Rupunuwini and the Mahu is farther north, where the mountain of Ucucuamo ‡ rises, which

* Is this name, which I take from the oral communication of Portugueze colonists, a corruption of Paravillanas? La Cruz gives this name to the easternmost branch of the Rio Branco. See above, p. 374.

† See above, p. 593. On the south of the Rupunury, but below the Uanauhau (Anava), other tributary streams of the Rio Branco rise from the small lakes Curiucu, Uraricory, and Uadauhau. Corogr. bras., vol. ii, p. 347.

‡ I follow the orthography of the manuscript journal of
the natives still call the *Mountain of Gold*. They advised Hortsmann, to seek round the Rio Mahu for a *mine of silver* (no doubt mica with large plates), of diamonds, and of emeralds. He found nothing but rocky crystals. His account seems to prove, that the whole length of the mountains of the Upper Oroonoko (*Sierra Parima*) toward the east is composed of granitic rocks, full of *druses* and open veins, like the Peak of Duida*. Near these lands, which still enjoy a great celebrity for their riches, on the western limits of Dutch Guyana, live the Macusis, Aturajoes, and Acuvajoes. The traveller Santos found them stationed between the Rupunuwini, the Mahu, and the chain of Pacaraimo. *It is the aspect of the micaceous rocks of the Ucucuamo, the name of the Rio Parima, the inundations of the rivers Urariapara, Parima, and Xurumu, and more especially the existence of the lake Amucu (near the Rio Rupunuwini, and regarded as the principal source of the Rio Parima), which have given rise to the fable of the White Sea and the Dorado of Parima. All these circumstances (which have served on this very account to corroborate the general opinion) are found united on a space of ground, which is eight or nine leagues broad from north to south, and forty long from east to

Rodriguez; it is the Cerro Acuquamo of Caulin, or rather of his commentator. (*Hist. corogr.*, p. 176.)

* See above, p. 506, and 553.
west. This direction too was always assigned to the *White Sea*, by lengthening it in the direction of the latitude, till the beginning of the sixteenth century *.

Now this *White Sea* is nothing but the Rio Parima, which is still called the *White River, Rio Branco, or Rio del Aguas blancas*, and runs through and inundates the whole of this land. The name of Rupunuwini † is given to the *White Sea* on the most ancient maps; which identifies the *place of the fable*, since of all the tributary streams of the Rio Essexequo the Rupunuwini is the nearest to the lake Amucu ‡. Raleigh, in his first voyage

* The latitudes of the lake Amucu and of the confluence of the Uraricuera with the Rio Parima and with the Rio Xurumu, differ very little; but on account of the direction of the Uraricuera (a western branch of the Rio Branco), which flows from west to east, the difference in the longitude becomes considerable. The *Valle de la Inundacion*, of which I have spoken above, is three degrees and a half west of lake Amucu and of the Rupunuwini, a circumstance which may have given rise to a fabulous enlargement of the *Mar Blanco*.

† See for instance the *Terra Firma* of Sanson, 1656.

(Hondius, in the *map of Guyana*, 1599, writes by mistake Foponowini.)

‡ This identity of name between the lake Parima and a tributary stream of the Essèquebo had already attracted the attention of D'Anville (*Journal des Savans*, 1750, p. 185), but did not prevent this learned geographer from restoring in the second edition of his *Amérique méridionale* the great lake Parima. This edition is of 1760. (*Notice des Ouvrages de D'Anville, par M. Barbé du Bocage*, p. 98.)
(1595), had formed no precise idea of the situation of el Dorado and the lake Parima, which he believed to be salt, and which he calls "another Caspian Sea." It was not till the second voyage (1596), performed equally at the expense of Raleigh, that Laurence Keymis fixed so well the localities of Dorado, that he appears to me to have no doubt of the identity of the Parima de Manoa with the lake Amucu, and with the isthmus between the Rupunuwini (a tributary stream of the Essequibo) and the Rio Parima or Rio Branco. "The Indians," says Keymis, "go up the Dessekebe (Essequibo) in twenty days, towards the south. To mark the greatness of this river, they call it the brother of the Oroonoko. After twenty days navigating they convey their canoes by a portage, a single day, from the river Dessekebe to a lake, which the Jaos call Roponowini, and the Caribbees Parime. This lake is as large as a sea; it is covered with an infinite number of canoes; and I suppose" (the Indians then had told him nothing of this), "that this lake is no other than that which contains the town of Manoa"*. Hondius has given a curious plate of this portage; and, as the mouth of the Carony was then

* Cayley's Life of Raleigh, vol. i, p. 159, 236, and 283. Masham, in the third voyage of Raleigh (1596), repeats these accounts of the lake Rupunuwini.
supposed to be in latitude 4° (instead of 8° 8'), the *portage* of Parima was placed close to the equator*. At the same period the Viapoco (Oyapoc) and the Rio Cayane (Maroni?) were made to issue from this lake Parima†. The same name being given by the Caribbees to the western branch of the Rio Branco has perhaps contributed as much to the imaginary enlargement of the lake Amucu, as the inundations of the various tributary streams of the Uraricuera, from the confluence of the Tacutu to the *Valle de la Inundacion*.

We have shown above, that the Spaniards took the Rio Paragua, or Parava, which falls into the Carony, for a lake, because the word *parava* signifies *sea, lake, river*. Parima seems also to denote vaguely *great water*; for the root *par* is found in the Caribbee words that designate *rivers, pools, lakes, and the ocean*‡. In Arabic and in Persian, *bahr* and *deria* are also applied at the same time to the sea, to lakes, and to rivers; and this practice, common to many nations in both worlds, has, on our ancient maps, converted lakes into rivers, and rivers

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* Brevis Descriptio Regni Guianæ, 1599, p. 11, tab. 4.
‡ See above, vol. iii, p. 277. In Persian, the root *water* (*ah*) is found also in *lake* (*abdan*). For other etymologies of the words *Parima* and *Manua* see Gili, vol. i, p. 81, and 141; and Gumilla, vol. i, p. 403.
into lakes. In support of what I here advance I shall appeal to very respectable testimony, that of father Caulin. "When I inquired of the Indians," says this missionary, who sojourne'd longer than I on the banks of the Lower Oroono-oko, "what Parima was; they answered, that it was nothing more than a river, that issued from a chain of mountains, the opposite side of which furnished waters to the Essequibo." Caulin, knowing nothing of lake Amucu, attributes the erroneous opinion of the existence of an inland sea solely to the inundations of the plains, a las inundaciones dilatadas por los bajos del pays*. According to him, the mistakes of geographers arise from the vexatious circumstance of all the rivers of Guyana having different names at their mouths and near their sources. "I have no doubt," he adds, "that one of the upper branches of the Rio Branco is that very Rio Parima, which the Spaniards have taken for a lake (a quien suponian laguna)." Such are the opinions, which the historiographer of the expedition of the boundaries had formed on the spot†. He could not expect, that La Cruz and

* This is also the opinion of Mr. Walkenaer (Cosmologie, p. 599), and of Mr. Malte-Brun (Geogr., vol. v, p. 523).
† The Rio Trumbetas and the Saraca, two tributary streams of the Amazon, which Caulin takes also for branches of the Rio Branco, are entirely independant of this river. (Hist. corogr., p. 80.) If father Caulin, in one of the notes
Surville, mingling old hypotheses with accurate ideas, would reproduce on their maps the Mar Dorado, or Mar Blanco. Thus, notwithstanding the numerous proofs, which I have furnished since my return from America, of the non-existence of an inland sea, the origin of the Oroonoko, a map has been published in my name*, on which the Laguna Parima figures anew.

From the whole of these statements it follows, 1st, that the Laguna Rupunuwini, or Parima of the voyage of Raleigh and of the maps of Honduras, is an imaginary lake, formed by the lake Amucu†, and the tributary streams of the Ura-ricuera, which often overflow their banks; 2dly, that the Laguna Parime of Surville's map is the lake Amucu, which gives rise to the Rio Pirara, added in 1779, make mention of the Laguna Parima (Lib. 1, c. 10, p. 60), it is only to denote the lake, from which the Pirara issues. (Gilli, vol. i, p. 325.)

* Carte de l'Amérique, dressée sur les Observations de M. de Humboldt, par Fried. (Vienna, 1818.) Notwithstanding my observation of the latitude at the rock of Culimacari, which gives 1° 53' 42" for San Carlos del Rio Negro, the equator is made to pass on this map, not between San Felipe and the mouth of the Guape, but at the confluence of the Uteta or Xie. This error is also found on the maps of Laurie and Whittle (1809), and on that of Cary (1817). See above, p. 413.

† This is the lake Amaca of Surville and La Cruz. By a singular mistake, the name of this lake is transformed into a village on Arrowsmith's map.
and (conjointly with the Mahu, the Tacutu, the Uraricuera or Rio Parima properly so called) to the Rio Branco; 3dly, that the Laguna Parime of La Cruz is an imaginary swelling of the Rio Parime (confounded with the Oronoko) below the junction of the Mahu with the Xurumu. The distance from the mouth of the Mahu to that of the Tacutu is scarcely 0° 40'; La Cruz* enlarges it to 7° of latitude. He calls the upper part of the Rio Branco (that which receives the Mahu) Oronoko, or Puruma. There can be no doubt of it's being the Xurumu, one of the tributary streams of the Tacutu, which is well known to the inhabitants of the neighbouring fort of San Joaquim. All the names† that

* The mouth of the Tacutu, which is in nearly 3° of north latitude, is (according to La Cruz) in 3° south. D'Anville had guessed better than his successors. He makes it's situation in 1° 10' north.

† The Sierra Mey (Mehi?) and the Atures Indians have been placed near the lake Parima and the imaginary sources of the Oronoko (Caulin, p. 81). The Caratitimani, one of the tributary streams of the eastern bank of the Rio Branco, receives in fact the Cano Aturu, and Santos found Aturajoes on the Mahu (Mao). The last river has perhaps given it's name to the Sierra Mei, of which the Indians of Esmeralda know nothing. (See above, p. 581.) Raleigh gives the name of Wacarima to the chain of mountains on the north of lake Parima, or lake Rupunuwini. We have just seen, that the Cordillera of Pacaraymo extends in fact to the north of the Rupunuwini, the Rio Xurumu, and the Rio Parima, tributary streams of the Uraricuera. The Majanaos (Maanaos?),
figure in the fable of Dorado are found in the tributary streams of the Rio Branco. Slight local circumstances, joined to the remembrances of the salt lake of Mexico, more especially of the celebrated lake Manoa in the *Dorado des Omaguas*, have served to complete a picture created by the imagination of Raleigh, and his two lieutenants Keymis and Masham. The inundations of the Rio Branco, I conceive, may be compared at the utmost to those of the Red river of Louisiana, between Natchitotches and Cados, but not to the *Laguna de los Xarayes*, which is a temporary swelling of the Rio Paraguay*.

Indians who now wander on the south-east of the lake Amazu, have been confounded, as Mr. Buache has well observed, with the *Manaos* (Manoas) of Jurubesh, celebrated in the history of the Dorado of the Omaguas and of the lake Manao, on the south of the Rio Negro. (*Carte générale de la Guyane, 1797.*) La Cruz calls the *White Sea* (which is an imaginary dilatation of the *White River*, or Rio Branco) *Parana-Pitinga*; but, among the Omaguas of the Upper Maragno, the Brazilians or northern Guaranies, and the Caribbees, consequently among nations more than 360 leagues distant from each other, *parana* signifies both a *river* and a *lake*. The Europeans give the name of *Rio Parana* to the eastern branch of the River de la Plata; which is as if they said, *Río Flumen*. The river, that separates the provinces of Alma-guer and Pasto, is called in the same manner *Río Mayo*, though *mayu*, in the fine language of the Incas, signifies *river* in general.

*Southey*, vol. i, p. 130. These periodical overflowings of the Rio Paraguay have long acted the same part in the
We have now examined a White Sea*, which the principal trunk of the Rio Branco is made to traverse; and another† which is placed on the east of this river, and communicates with it by the Cano Pirara. A third lake‡ is figured on the west of the Rio Branco, respecting which I found recently some curious details in the manuscript journal of the surgeon Hortsmann. "At the distance of two days' journey below the confluence of the Mahu (Tacutu) with the Rio Parima (Uraricuera) a lake is found on the top of a mountain. This lake is stocked with the same fish as the Rio Parima; but the waters of the former are black, and those of the latter white.§" May not Surville, from a vague notion of this basin, have imagined, in his map prefixed southern hemisphere, as lake Parima has been made to perform in the northern. Hondius and Sanson have made the Rio de la Plata, the Rio Topajos (a tributary stream of the Amazon), the Rio Tocantines, and the Rio de San Francisco, issue from the Laguna de los Xarayes.

* That of D'Anville and La Cruz, and of the greater part of the modern maps.
† The lake of Surville, which takes the place of lake Amucu.
‡ The lake which Surville calls Laguna tenida hasta ahora por la Laguna Parime.
§ "Aos 24 de junho 1740. Rio Parima, no qual logo, 2 dias depois da minha entrada, esta hum monte, o qual tem hum grande lago no cinza; o qual fiz ver e achei peixe, no dito lago, da mesma sorte como se acham no mesmo Rio; de-mais a agua he preta no lago, e no Rio Branco."
to father Caulin's work, an Alpine lake of ten leagues in length, near which, towards the east, rise at the same time the Oroonoko, and the Rio Idapa, a tributary stream of the Rio Negro? However vague may be the account of the surgeon of Hildesheim, it is impossible to admit, that the mountain, which has a lake at it's summit, is to the north of the parallel of 2° 30': and this latitude coincides nearly with that of the Cerro Unturan. Hence it follows, that the Alpine lake of Hortsmann, which has escaped the attention of D'Anville, and which is perhaps situate amid a group of mountains, lies northeast of the portage from the Idapa to the Mavaca, and south-east of the Oroonoko, where it goes up above Esmeralda*.

Most of the historians, who have treated of the first ages of the conquest, seem persuaded, that the name provincias or pais del Dorado denoted originally every region abounding in

* See my itinerary map, Pl. 16; and above, p. 375 and 556. This reasoning is founded on the latitude of Esmeralda, which I found to be 3° 11'. A lake situate to the north of the Cerro Unturan, and on the banks of which the Portuguese colonists gather the pichurim bean, seems to prove, that there exist Alpine lakes in the unknown land between the Oroonoko and the Idapa. There are probably 4° of longitude between the point of the Rio Branco, which Hortsmann had reached on the 24th of June, 1740, and the Raudal des Guaharibos, the last point of the Upper Oroonoko, of which we have at present any certain knowledge.
gold. Forgetting the precise etymology of the word *Dorado* (the gilded), they have not perceived, that this tradition is a *local fable*, as were almost all the ancient *fables* of the Greeks, the Hindoos, and the Persians. The history of the *Gilded Man* belongs originally to the Andes of New Grenada, and particularly to the plains in the vicinity of their eastern side: we see it progressively advance, as I observed above, three hundred leagues toward the east-north-east, from the sources of the Caqueta to those of the Rio Branco and the Essequibo. Gold was sought in different parts of South America before 1536, without the word *Dorado* having been ever pronounced, and without the belief of the existence of any other centre of civilization and wealth, than the empire of the Inca of Cuzco. Countries which now do not furnish commerce with the smallest quantities of the precious metals, the coast of Paria, Terra Firma (*Castilla del Oro*), the mountains of *Saint Martha*, and the isthmus of Darien, then enjoyed the same celebrity, which has been more recently acquired by the auriferous lands of Sonora, Choco, and Brazil*.

* I have developed the causes of the apparent riches of coasts recently discovered, in a work, which treats particularly of the accumulation of the precious metals in Europe and Asia, *Essai Polit. sur la Nouv. Esp.*, tom. ii, chap. 2, p. 646.
Diego de Ordaz (1531) and Alonzo de Herera (1535) directed their journeys of discovery along the banks of the Lower Oroonoko. The former is the famous conquistador of Mexico, who boasted* that he had taken sulphur out of the crater of the Peak of Popocatepetl, and whom the emperor Charles V permitted to bear a burning volcano in his arms. Ordaz, named adelantado of all the country which he could conquer between Brazil and the coast of Venezuela, which was then called the country of the German Company of Welsers (Belzares) of Augsburg, began his expedition by the mouth of the Maraggon. He there saw, in the hands of the natives, "emeralds as big as a man's fist." They were no doubt pieces of those saussurite jade, or compact feldspar, which we brought home from the Oroonoko, and which Mr. de la Condamine found in abundance at the mouth of the Rio Topayos†. The Indians related to Diego de Ordaz, "that on going up during a certain number of suns toward the west, he would find a large rock (pena) of green stone;" but before they reached this pretended mountain of emerald (rocks of euphotide?) a shipwreck put an end to all farther discovery. The Spaniards saved themselves with difficulty in

* Ib. vol. ii, p. 672.
† See above, p. 380, 392.
two small vessels. They hastened to get out of the mouth of the Amazon; and the currents, which in those parts run with violence to the north-west, led Ordaz to the coast of Paria, where in the territory of the cacique Yuripari (Uriapari, Viapari), Sedeno had constructed the Casa fuerte de Paria*. This post being very near the mouth of the Oroonoko, the Mexican conquistador resolved to attempt an expedition on this great river. He sojourned first at Carao (Caroa, Carora), a large Indian village, which appears to me to have been a little to the east of the confluence of the Carony; he then went up the Cabruta (Cabuta, Cabritu), and to the mouth of the Meta (Metacuyu), where he found great difficulty in passing his boats through the Raudal of Cariven. We have seen above, that the bed of the Oroonoko near the mouth of the Meta is filled with shoals. The Aruacas, whom Ordaz employed as guides advised him to go up the Meta; where, on advancing towards the west, they asserted he

* This station, and those of Cubagua, Araya, and Macarapana (Amaracapan), were celebrated in the 16th century, as are in our days those of Sierra Leone and Port Jackson. The situation of the fortress of Paria appears to me to have been, not on the coast of Paria, but to the south of it, between the Guarapiche and the mouth of the Cano Manamo. Very ancient maps sometimes even place the Fuerte in the delta of the Oroonoko. It must be observed too, that the name of Paria was then applied to a great part of South America.
would find men clothed, and gold in abundance. Ordaz pursued in preference the navigation of the Oroonoko, but the cataracts of Tabaje (perhaps even those of the Atures) compelled him to terminate his discoveries*.

It is worthy of remark, that in this voyage, far anterior to that of Orellana, and consequently the greatest which the Spaniards had then performed on a river of the New World, the name of the Oroonoko was for the first time heard. Ordaz, the leader of the expedition, affirms, that the river, from it's mouth as far as the confluence of the Meta, is called *Uriaparia, but that above this confluence it bears the name of Orinuco. This word (formed analogously with the words Tamanacu, Otomacu, Sinarucu) is in fact of the Tamanac tongue; and, as the


Ordaz gives no name to the cataracts by which he was stopped; but those, which I have mentioned in the text, appear to me to be clearly indicated by their geographical situation. (See above, vol. iv, p. 561, and 569.) Father Caulin confounds the Raudal of Cariven with that of Camiseta; and the Raudal of Tabaje, near San Borja, with that of Carichana; though historians place the first (una cinta de penas) below Cabruta, and the cataract which prevented all farther navigation above the confluence of the Meta. Admitting that the distances are not much exaggerated in the narratives of the conquistadores, we may believe, that Ordaz went as far as the Raudal of Atures.
Tamanacs dwell south-east of Encaramada, it is natural, that the conquistadores heard the actual name of the river only on drawing near the Rio Meta*. On this last tributary stream Diego de Ordaz received from the natives the first idea of

* Gili, vol. iii, p. 381. The following are the most ancient names of the Oroonoko, known to the natives near it's mouth, and which historians give us altered by the double fault of pronunciation and orthography; Yuyapari, Yjupari, Huriaparia, Uriapari, Viapari Rio de Paria. The Tamanac word Orinucu was disfigured by the Dutch pilots into Worinoque. The Otomacs say Joga-apurura (great river); the Cabres and Guaypunabis, Paragua, Bazagua, Parava, three words signifying great water, river, sea. That part of the Oroonoko between the Apure and the Guaviare is often denoted by the name of Baraguan. A famous strait, which we have described above, bears also this name, which is no doubt a corruption of the word Paragua. Great rivers in every zone are called by the dwellers on their banks the river, without any particular denomination. If other names be added, they change in every province. Thus the small Rio Turiva, near the Encaramada, has five names in the different parts of it's course. The Upper Oroonoko, or Paragua, is called by the Maquiritares (near Esmeralda) Maraguaca, on account of the lofty mountains of this name near Duida. (See above, vol. iii, p. 276; vol. iv, p. 502; and the present vol. p. 219,478. Gili, vol. i, p. 22 and 364. Caulin, p. 75.) In most of the names of the rivers of America we recognize the root water. Thus yacu in the Peruvian, and veni in the Maypure, signify water and river. In Lule I find fo, water; foyavalto, a river; foysi, a lake; as in Persian, ab is water; abi frat, river Euphrates; abdan, a lake. The root water is preserved in the derivatives.
civilized nations, who inhabited the table-lands of the Andes of New Granada; "of a very powerful prince with one eye (indio tuerto), and of animals less than stags, but fit for riding like Spanish horses." Ordaz had no idea, that these animals were the *lamas*, or *ovejas del Peru*. Must we admit, that the lamas, which were used in the Andes to draw the plough and as beasts of burden, but not for riding, were already common on the north and east of Quito? I find, that Orellana saw these animals at the river of Amazons, above the confluence of the Rio Negro, consequently in a climate very different from that of the table-land of the Andes*. The fable of an army of Omaguas mounted on lamas served to embellish the account given by the fellow travellers of Felipe de Urre of their adventurous expedition to the Upper Caqueta. We cannot be sufficiently attentive to these traditions, which seem to prove, that the domestic animals of Quito and Peru had already begun to descend the Cordilleras, and spread themselves by degrees in the eastern regions of South America.

Herera, the treasurer of the expedition of Ordaz, was sent in 1533 by the governor Gerónimo de Ortal, to pursue the discovery of the Oroonoko and the Meta. He lost nearly thir-
teen months between Punta Barima and the confluence of the Caroni in constructing flat-bottomed boats, and making the preparations indispensable for a long voyage. We cannot read without astonishment the narrative of those daring enterprises, in which three or four hundred horses were embarked, to be put ashore whenever cavalry could act on one of the banks. We find in the expedition of Herera the same stations, which we already knew; the fortress of Paria, the Indian village of Uriaparia (no doubt below Imataca, on a point where the inundations of the Delta prevented the Spaniards from being able to procure firewood), Caroa, in the province of Carora*; the rivers Caranaca (Caura?) and Caxavana (Cuchivero?);

* Probably the territory of the missions of Carony, inhabited by Caribbees, along the Rio Aquire (Aquil of Herera). The initial syllable car denotes a Caribbee origin, as in Cariai, Carapana, Caripe, Caroni (Caruni), Carapo, &c. (Garcia, del Origen de los Indios, p. 234). Caribana, near the gulf of Darien, the ancient seat of the Caribbees, was called Cariai. (Petr. Martyr, p. 242, 255. Churchill, p. 608. Gomara, p. 35. Lettera rarissima di Christ. (Colombo, 1810, p. 25.) The ancient name of the island of Guadaloupe was Carucueira; and that of the island of Trinidad, Cairi. (Geraldini, p. 193.) A great number of the geographical names of those regions were no doubt significative, since they are found several times along the coast of Paria, and in the West India islands; such as Tacarigua, Cumana, Chuparipari, Arauca, Cariero, and Gauya-Guajare.
the village of Cabritu (Cabruta), and the Rau-
dal* near the mouth of the Meta (probably the
Raudal of Cariven and the Piedra de la Pacien-
cia). As the Rio Meta, on account of the prox-
imity of its sources and of its tributary streams
to the auriferous Cordilleras of new Grenada
(Cundinamarca), enjoyed great celebrity, He-
rrera attempted to go up this river. He there
found nations more civilized than those of the
Oroonoko, but that fed on the flesh of mute
dogs†. Herera was killed in battle by an
arrow poisoned with the juice of *curare (yierva)
and when dying named Alvaro de Ordaz his
lieutenant, who led the remains of the expedition
(1535) to the fortress of Paria, after having lost
the few horses, which had resisted a campaign
of eighteen months.

Confused reports which were circulated on
the wealth of the inhabitants of the Meta, and
the other tributary streams that descend from
the eastern side of the Cordilleras of New Gre-
nada, engaged successively Geronimo de Ortal,
Nicolas Federmann, and Jorge de Espira (Georg
von Speier), in 1535 and 1536, to undertake
expeditions by land towards the south and south-

* "La singla de peñascos, vista por Ordaz, que travesa el
rio por debaxo las aguas y que hace gran oleaje." Fray Pedro
p. 150, 153.

† See above, p. 671.
west. From the promontory of Paria as far as Cabo de la Vela, little figures of molten gold had been found in the hands of the natives, as early as the years 1498 and 1500. The principal markets for these amulets, which the women used as ornaments, were the villages of Curiana (Coro) and Cauchieto* (near the Rio la Hacha). The metal employed by the founders of Cauchieto came from a mountainous country more to the south. It may be conceived, that the expeditions of Ordaz and Herera served to increase the desire of drawing nearer to those auriferous countries. Georg von Speier left Coro (1535), and penetrated by the mountains of Merida to the banks of the Apure and the Meta. He passed these two rivers near their sources, where they have but little breadth. The Indians told him, that farther on white men wandered about the plains. Speier, who imagined that he was not far from the banks of the Amazon, had no doubt, that these wandering Spaniards were men unfortunately shipwrecked in the expedition of Ordaz. He crossed the savannahs of San Juan de los Llanos, which were said to abound in gold; and made a long stay at an Indian village, called Pueblo de Nuestra Señora, and afterward la Fragua†, south-

* See above, vol. iii, p. 526.
† This Indian village, the name of which the Spaniards
east of the Paramo de la Surna Paz. I have been on the western back of this group of mountains, at Fusagasuga, and there heard, that the plains, by which they are skirted toward the east, still enjoy some celebrity for wealth among the natives. Speier found in the populous village of la Fragua a Casa del Sol (temple of the Sun), and a convent of virgins, similar to those of Peru and New Grenada. Were these the consequence of a migration of religious rites toward the east? or must we admit, that the plains of San Juan were their first cradle? Tradition indeed records, that Bochica, the legislator of New Grenada, and high-priest of Iraca, had gone up from the plains of the east to the table-land of Bogota. But Bochica being at once the offspring and the symbol of the Sun, his history may contain allegories, that are merely astrological*. Speier, pursuing his way toward the south, and crossing the two branches of the Guaviare, which are the Ariare and the Guayaver (Guayare or Canicamare), arrived on the banks of the great Rio Papamene† or Caqueta.

have changed, is not situate on the Rio Fragua itself, one of the branches of the Caqueta, for Speier passed the Rio Ariare after having sojourned in the village of Fragua.

* See my Views of the Cordilleras and American Monuments, vol. ii, (or xiv of the present work) p. 135.
† See above, p. 319. The geographer La Cruz Olmedilla, gives the name of Papamene to the little river Timana,
The resistance he met with during a whole year in the province de los Choques put an end in 1537 to this memorable expedition*. Nicolas Federmann and Geronimo de Ortal (1536), who went from Macarapana and the mouth of the Rio Neveri, followed (1535) the traces of Jorge de Espira. The former sought for gold in the Rio Grande de la Magdalena; the latter endeavoured to discover a temple of the Sun (Casa del Sol) on the banks of the Meta. Ignorant of the idiom of the natives, they seemed to see everywhere, at the foot of the Cordilleras, the reflexion of the greatness of the temples of Iraca (Sogamozo), which was then the centre of the civilization of Cundinamarca.

I have now examined in a geographical point which falls into the Rio Magdalena above the Rio Suaza; but Fray Pedro Simon leaves no doubt respecting the real course of the Papamene (a name which signifies river of silver). He says expressly (p. 332 and 666); "nace este gran rio a la parte del este de las Cordilleras de Timana, como las aguas del oeste caen al rio de la Magdalena." The provincial of New Grenada, Fray Pedro Simon, composed his memoirs from those of the Adelantado Gonzalo Ximenez de Quesada, whose government "tenia por terminos por la parte del este la provincia de Papamene." He must therefore have been well informed of the localities. Raleigh believes erroneously, that the Rio Papamene is the river, by which Orella proceeded down to the Amazon. He confounds the Napo with the Caqueta. (Raleigh, p. 13.)

* Fray Pedro Simon, p. 171, 179, 188, 202, 278: and Herera. Descr. geogr., p 32
of view, the expeditions on the Oroonoko, and in a western and southern direction on the eastern back of the Andes, before the tradition of *el Dorado* was spread among the *conquistadores*. This tradition, as we have noticed above, had it's origin in the kingdom of Quito, where Luis Daza (1535) met with an Indian of New Grenada, who had been sent by his prince (no doubt the *zippa* of Bogota, or the *zaque* of Tunja), to demand assistance from Atahualpa, inca of Peru. This ambassador boasted, as is usual, the wealth of his country; but what particularly fixed the attention of the Spaniards, who were assembled with Daza in the town of Tacunga (Llactacunga), was the history of a lord, "who, his body covered with powdered gold, went into a lake amid the mountains*."

This lake may have been the Laguna de Totta, a little to the east of Sogamozo (Iraca) and of Tunja (Hunca, the town of Huncahua), where two chiefs, ecclesiastical and secular, of the empire of Cundinamarca, or Cundirumarca, resided; but no historical remembrance being attached to this mountain lake, I rather suppose, that it was the *sacred lake of Guatavita*†, on the


† *Views of the Cordilleras*, vol. ii, (or xiv), Pl. 67. *Herera, Descr. geogr.*, p. 32.
east of the mines of rock salt of Zipaquira, into which the gilded lord was made to enter. I saw on it's banks the remains of a staircase hewn in the rock, and serving for the ceremonies of ablution. The Indians said, that powder of gold and golden vessels were thrown into this lake, as a sacrifice to the idols of the adoratorio de Guatavita. Vestiges are still found of a breach, which was made by the Spaniards for the purpose of draining the lake. The temple of the Sun at Sogamozo being pretty near the northern coasts of Terra Firma, the notions of the gilt man were soon applied to a high priest of the sect of Bochica, or Idacanzas, who every morning, before he performed his sacrifice, caused powder of gold to be stuck upon his hands and face, after they had been smeared with grease. Other accounts, preserved in a letter of Oviedo addressed to the celebrated cardinal Bembo say, that Gonzalo Pizarro, when he discovered the province of cinnamon trees, "sought at the same time a great prince, noised in those countries, who was always covered with powdered gold, so that from head to foot he resembled a una figura d'oro lavorata di mano d'un buonissimo orifice. The powdered gold is fixed on the body by means of an odoriferous resin; but, as this kind of garment would be uneasy to him while he slept, the prince washes himself every evening, and is gilded anew in the morning, which proves,
that the empire of el Dorado is infinitely rich in mines." It seems probable, that there was something in the ceremonies of the worship introduced by Bochica, which gave rise to a tradition so generally spread. The strangest customs are found in the New World. In Mexico the sacrificers painted their bodies, and wore a kind of cope with hanging sleeves of tanned human skin. I have published drawings of them made by the ancient inhabitants of Anahuac, and preserved in the books of their rituals.

On the banks of the Caura, and in other wild parts of Guyana, where painting the body is used instead of tattooing, the nations anoint themselves with turtle fat, and stick spangles of mica with metallic lustre, white as silver, and red as copper, on their skin, so that at a distance they seem to wear laced clothes. The fable of the gilded man is perhaps founded on a similar custom; and, as there were two sovereign princes in New Grenada*, the lama of Iraca, and the secular chief or zaque of Tunja, we cannot be surprised, that the same ceremony was attributed sometimes to the prince, and sometimes to the high priest. It is more extraordinary, that as early as the year 1535 the country of Dorado was sought for on the east of the Andes. Robertson is

* According to the analogy of the ancient government of Meroë, that of Thibet, and of the dairi and kubo in Japan.
mistaken* in admitting, that Orellana received the first notions of it (1540) on the banks of the Amazon. The history of Fray Pedro Simon, founded on the memoirs of Quesada, the conqueror of Cundirumarca, proves directly the contrary; and Gonzalo Diaz Pe Pineda, as early as 1536, sought for the *gilded man* beyond the plains of the province of Quixos. The ambassador of Bogota, whom Daza met with in the kingdom of Quito, had spoken of a country situate toward the east. Was this because the table-land of New Grenada is not on the north, but on the north-east of Quito? We may venture to say, that the tradition of a naked man covered with powdered gold must have belonged originally to a hot region, and not to the cold table-lands of Cundirumarca, where I often saw the thermometer sink below four or five degrees; however, on account of the extraordinary configuration of the country, the climate differs greatly at Guatavita, Tunja, Iraca, and on the banks of the Sogamozo. Sometimes also religious ceremonies are preserved, which took rise in another zone; and the Muyscas, according to ancient traditions, made Bochica, their first legislator and the founder of their worship, arrive from the plains situate to the east of the Cordilleras. I shall not decide whether these

traditions expressed an historical fact, or merely indicated, as we have already observed in another place, that the first lama, who was the offspring and symbol of the Sun, must necessarily have come from the countries of the East. Be it as it may, it is not less certain, that the celebrity, which the expeditions of Ordaz, Herrera, and Speier had already given to the Oroonoko, the Meta, and the province of Papamene, situate between the sources of the Guaviare and the Caqueta, contributed to fix the fable of el Dorado near to the eastern back of the Cordilleras.

The junction of three bodies of troops on the tableland of New Grenada spread through all that part of America occupied by the Spaniards the news of an immensely rich and populous country, which remained to be conquered. Sebastian de Belalcazar marched from Quito by way of Popayan (1536) to Bogota; Nicolas Federmann, coming from Venezuela, arrived from the East by the plains of Meta. These two captains found already settled on the table land of Cundirumara the famous adelantado Gonzalo Jimenez de Quesada, one of whose descendants I saw near Zipaquira, with bare feet, attending cattle. The fortuitous meeting of the three conquistadores, one of the most extraordinary and dramatic events of the history of the conquest, took place in 1538. Belalcazar’s narratives
inflamed the imagination of warriors eager for adventurous enterprises; and the notions communicated to Luis Daza by the Indian of Tacunga were compared with the confused ideas, which Ordaz had collected on the Meta respecting the treasures of a great king with one eye (Indio tuerto), and a people clothed, who rode upon llamas. An old soldier, Pedro de Limpias, who had accompanied Federmann to the tableland of Bogota, carried the first news of Dorado to Coro, where the remembrance of the expedition of Speier (1535—1537) to the Rio Papamene was still fresh. It was from this same town of Coro, that Felipe von Huten (Urre, Utre) undertook his celebrated voyage to the province of the Omaguas, while Pizarro, Orellana, and Hernan Perez de Quesada, brother of the adelantado, sought for the gold country at the Rio Napo, along the river of the Amazonas, and on the eastern chain of the Andes of New Grenada. The natives, in order to get rid of their troublesome guests, continually described Dorado as easy to be reached, and situate at no considerable distance. It was like a phantom, that seemed to flee before the Spaniards, and to call on them unceasingly. It is in the nature of man wandering on the Earth, to figure to himself happiness beyond the region which he knows. El Dorado, similar to Atlas and the islands of the Hesperides, disappeared
by degrees from the domain of geography, and entered that of mythological fictions.

I shall not here relate the numerous enterprises, which were undertaken for the conquest of this imaginary country. Unquestionably we are indebted to them in great part for our knowledge of the interior of America; they have been useful to geography, as errors and daring hypotheses are often to the search of truth: but in the discussion on which we are employed, it is incumbent on me to rest only upon those facts, which have had the most direct influence on the construction of ancient and modern maps. Hernan Perez de Quesada, after the departure of his brother the adelantado for Europe, sought anew (1539), but this time in the mountainous land north-east of Bogota, the temple of the Sun (Casa del Sol), of which Geronimo de Ortal had heard spoken in 1536 on the banks of the Meta. The worship of the Sun introduced by Bochica, and the celebrity of the sanctuary of Iraca, or Sogamozo, gave rise to those confused reports of temples and idols of massy gold; but on the mountains as in the plains, the traveller believed himself to be always at a distance from them, because the reality never corresponded with the chimerical dreams of the imagination. Francisco de Orellana, after having vainly sought Dorado with Pizarro in the Provincia de los Canelos, and on the auriferous banks of the Napo,
went down (1540) the great river of the Amazons. He found there, between the mouths of the Javari and the Rio de la Trinidad (Yupura?), a province rich in gold, called Machiparo (Muchifaro), in the vicinity of that of the Aomaguas, or Omaguas. These notions contributed to carry Dorado toward the south-east, for the names Omaguas (Om-aguas, Aguas), Dit-aguas, and Papamene, designated the same country; that which Jorge de Espira had discovered in his expedition to the Caqueta*. The Omaguas, the Manaos or Manoas, and the Guaypes† (Uaupes or Guayupes) live in the plains on the north of the Amazon. They are three powerful nations, the latter of which, stretching toward the west along the banks of the Guape or Uaupé, had been already mentioned in the voyages of Quesada and Huten. These two conquistadores, alike celebrated in the history of America, reached by different roads the llanos of San Juan, then called Valle de Nuestra Senora. Hernan Perez de Quesada (1541) passed the Cordilleras of Cundirumarca, probably between the Paramos of Chingasa and Suma Paz; while Felipe de Huten, accompanied by Pedro de Limpias (the same who had carried to Venezuela the first news

of Dorado from the tableland of Bogota), directed his course from north to south, by the road which Speier had taken to the eastern side of the mountains. Huten left Coro, the principal seat of the German factory, or company of Welser, when Henry Remboldt was its director. After having traversed (1541) the plains of Casanare, the Meta, and the Caguan, he arrived at the banks of the Upper Guaviare (Guayuare), a river which was long believed to be the source of the Oroonoko, and the mouth of which I saw in passing by San Fernando de Atabapo to the Rio Negro. Not far from the right bank of the Guaviare Huten entered Macatoa, the city of the Guapes. The people there were clothed, the fields appeared well cultivated; every thing denoted a degree of civilization unknown in the hot region of America, which extends to the east of the Cordilleras. Speier, in his expedition to the Rio Caqueta and the province of Papamene, had probably crossed the Guaviare far above Macatoa, before the junction of the two branches of this river, the Ariari and the Guyavero. Huten was told, that on advancing more to the southeast he would enter the territory of the great nation of the Omaguas, the priest king of which was called Quareca, and which possessed numerous herds of lamas. These traces of cultivation, these ancient resemblances to the tableland
of Quito, appear to me very remarkable. It has already been said above, that Orellana saw *lamas* at the dwelling of an Indian Chief on the banks of the Amazon, and that Ordaz had heard mention made of them in the plains of Meta.

I pause where ends the domain of geography, and shall not follow Huten in the description either of that town of immense extent, which he *saw from afar*; or of the battle of the Omaguas, where thirty-nine Spaniards (the names of fourteen are recorded in the annals of the time) fought against fifteen thousand Indians. These false reports contributed greatly to embellish the fable of *Dorado*. The name of the town of the Omaguas is not found in the narrative of Huten; but the *Manoas*, from whom father Fritz received in the 17th century plates of beaten gold, in his mission of Yurim-Aguas, are neighbours of the Om-aguas. The name of *Manoa* subsequently passed from the country of the Amazons to an imaginary town, placed in the *Dorado de la Parima*. The celebrity attached to those countries between the Caqueta (Papamene) and the Guaupe (one of the tributary streams of the Rio Negro) excited Pedro de Ursua in 1560 to that fatal expedition, which ended by the revolt of the tyrant Aguirre*.

* See above, vol. iv, p. 257, where we have given the translation of a letter addressed to Philip II by Aguirre.
Ursua, in going down the Caqueta to enter the river of the Amazons, heard of the province of Caricuri*. This denomination clearly indicates the country of gold, for I find that this metal is called caricuri in the Tamanac, and carucuru in the Caribbee. Is it a foreign word, that denotes gold among the nations of the Oroonoko, as the words sugar and cotton are in our European languages? This would prove, that these nations learned to know the precious metals among the foreign products, which came to them from the Cordilleras†, or from the plains at the eastern back of the Andes.

We arrive now at the period when the fable of Dorado was fixed in the eastern part of Guyana, first at the pretended lake Cassipa (on the banks of the Paragua, a tributary stream of the Carony), and afterward between the sources of the Rio Essequibo and the Rio Branco. This circumstance has had the greatest influence on the state of geography in those countries. Antonio de Berrio, son in law‡ and sole heir of the great

* Fray Pedro Simon, p. 422.
† In Peruvian or Quichua (lengua del Inga) gold is called cori, whence are derived chichicori, gold in powder, and corikoya, gold ore.
‡ Properly "casado con una sobrina." (Fray Pedro Simon, p. 597 and 608. Harris, Coll., vol. ii, p. 212. Lact, p. 652. Caulin, p. 175.) Raleigh calls Quesada Cemenes de Casada. He also confounds the periods of the voyages of
adelantado Gonzalo Ximenez de Quesada, passed the Cordilleras to the east of Tunja*, embarked on the Rio Casanare, and went down by this river, the Meta, and the Oroonoko, to the island of Trinidad. We scarcely know this voyage except by the narrative of Raleigh; it appears to have preceded a few years the first foundation of Vieja Guayana, which was in the year 1591. A few years later (1595) Berrio caused his maese de campo, Domingo de Vera, to prepare in Europe an expedition of two thousand men to go up the Oroonoko, and conquer Dorado, which then began to be called the country of the Manoa, and even the Laguna de la gran Manoa. Rich landholders sold their farms, to take part in a croisade, to which twelve Observantin monks, and ten secular ecclesiastics were annexed. The Ordaz (Ordace), Orellana (Oreliano), and Ursua. See Empire of Guiana, p. 13—20.

* No doubt between the Paramos of Chita and of Zoraca, taking the road of Chire and Pore. Berrio told Raleigh, that he came from the Rio Casanare to the Pato, from the Pato to the Meta, and from the Meta to the Baraguan (Oroonoko). We must not confound this Rio Pato (a name connected no doubt with that of the ancient mission of Patuto) with the Rio Paute. (See my Atlas, Pl. 19.) The Meta bears erroneously on the maps of the 17th century the name of Baraguan (Churchill, Coll., vol. viii, p. 757), of San Pedro, and of Rio Barquecimito. The last is a tributary stream of the Portuguesa and the Apure.
tales related by one Martinez* (Juan Martin de Albujar?), who said he had been abandoned in

*I believe I can demonstrate, that the fable of Juan Martinez, spread abroad by the narrative of Raleigh, was founded on the adventures of Juan Martin de Albujar, well known to the Spanish historians of the Conquest; and who, in the expedition of Pedro de Silva (1570), fell into the hands of the Caribbees of the Lower Oroonoko. This Albujar married an Indian woman, and became a savage himself, as happens sometimes in our days on the western limits of Canada, and of the United States. After having long wandered with the Caribbees, the desire of rejoining the Whites led him by the Rio Essequibo to the island of Trinidad. He made several excursions to Santa Fe de Bogota, and at length settled at Carora. (Simon, p. 591.) I know not whether he died at Portorico; but it cannot be doubted, that it was he who learned from the Caribbee traders the name of the Manoa (of Jurubesh). As he lived on the banks of the Upper Carony, and reappeared by the Rio Essequibo, he may have contributed also, to place the lake Manoa at the isthmus of Rupunuwini. Raleigh makes his Juan Martinez disembark below Morequito, a village at the east of the confluence of the Carony with the Oroonoko. Thence he makes him dragged by the Caribbees from town to town, till he finds at Manoa a relation of the inca Atabalipa (Atahualpa), whom he had known before at Caxamarca, and who had fled before the Spaniards. It appears, that Raleigh had forgotten, that the voyage of Ordaz (1531) was two years anterior to the death of Atahualpa, and the entire destruction of the empire of Peru! He must have confounded the expedition of Ordaz with that of Silva (1570), in which Juan Martin de Albuzar partook. The latter, who related his tales at Santa Fe, at Venezuela, and perhaps at Portorico, must have combined what he had heard from the Caribbees with what he had
the expedition of Diego de Ordaz, and led from
town to town till he reached the capital of Do-
rado, had inflamed the imagination of Berrio.
It is difficult to distinguish what this conquis-
tador had himself observed in going down the
Oroonoko from what he said he had collected
in a pretended journal of Martinez, deposited at
Portorico. It appears, that in general at that
period the same ideas prevailed respecting Ame-
rica, as those which we have long entertained in
regard to Africa; it was imagined, that more
civilization would be found toward the cen-
tre of the continent, than on the coasts. Already
Juan Gonzalez, whom Diego de Ordaz had sent
in 1531, to explore the banks of the Oroonoko,
announced, that "the farther you went up this
river, the more you saw the population increas-
ed*." Berrio mentions the often inundated pro-
vince of Amapaja, between the confluence of
the Meta and the Cuchivero, where he found
many little idols of molten gold, similar to
those which were fabricated at Cauchieto, east
of Coro. He believed this gold to be a pro-

learned from the Spaniards respecting the town of the Oma-
guas seen by Huten, of the gilded man who sacrificed in
a lake, and of the flight of the family of Atahualpa into the
forests of Vilcabamba, and the eastern Cordillera of the
Andes. (Garcilasso, vol. ii, p. 194.)

* "Mientras mas se subia el Rio Viapari (Orinoco), may-
duct of the granitic soil, that covers the moun-
tainous country between the Carichhana, Uruana, and Cuchivero. In fact, the natives have re-
cently found a mass of native gold* in the Quebrada del Tigre, near the mission of Enca-
ramada. Berrio mentions on the east of the province of Amapaja the Rio Carony (Caroly), which was said to issue from a great lake, because one of the tributary streams of the Carony, the Rio Paragua (river of the great water), had been taken for an inland sea, from ignorance of the Indian languages. Several Spanish historians† believed, that this lake, the source of the Carony, was the Grand Manoa of Berrio; but the notions he communicated to Raleigh show, that the Laguna de Manoa (del Dorado, or de Parime) was supposed to be to the south of the Rio Paragua, transformed into Laguna Cassipa. "Both these basins had auriferous sands; but on the banks of the Cassipa was situate Macureguairai (Margureguaira), the capital of the cacique of Aromaja‡, and the first city of the imaginary empire of Guyana."

* See above, vol. iv, p. 471.
† "Le gran Manoa es una gran laguna que da principio á un rio, que entra por la vanda del sur en el Orinoco cerca la Ciud
dad de San Thomè." Simon, p. 608.
‡ Aru-Mayu? Is this name connected with that of the Rio Arui, the sources of which are so near the Rio Paragua, that it was believed to issue from the same lake as this river?
As these often inundated lands have been at all times inhabited by nations of the Caribbee race, who carried on a very active inland trade with the most distant regions, we must not be surprised, that more gold was found here in the hands of the Indians than elsewhere. The natives of the coast did not employ this metal in the form of ornaments or amulets only; but also in certain cases* as a medium of exchange. It is not extraordinary therefore, that gold has disappeared on the coast of Paria, and among the nations of the Oroonoko, since their inland communications have been impeded by the Europeans. The natives who have remained indignant are in our days, no doubt, more wretched, more indolent, and in a ruder state, than they were before the Conquest. The king of Morequito whose son Raleigh took to England, had visited Cumana in 1594, to exchange a great quantity of images of massy gold for iron tools, and European merchandize. The unexpected appearance of an Indian chief augmented the celebrity of the riches of the Oroonoko. It was supposed, that Dorado must be near the country, from which the king of Morequito came; and as this country was often inundated, and rivers vaguely called great seas, great basins of water, Dorado must be on the banks of a

* Among the Teques. See above, vol. iii, p. 530.
lake. It was forgotten, that the gold, brought by the Caribbees and other trading people, was as little the produce of their soil, as the diamonds of Brazil and India are the produce of the regions of Europe, where they are most abundant. The expedition of Berrio, which had increased in number during the stay of the vessels at Cumana, la Margaretta, and the island of Trinidad, proceeded by Morequito (near Vieja Guayana) toward the Rio Paragua, a tributary stream of the Carony; but sickness, the ferocity of the natives, and the want of subsistence, opposed invincible obstacles to the progress of the Spaniards. They all perished; except about thirty, who returned in a deplorable state to the post of Santo Thome.

These disasters did not calm the ardor displayed during the first half of the 17th century in the search of Dorado. The governor of the island of Trinidad, Antonio de Berrio, became the prisoner of Sir Walter Raleigh, in the celebrated incursion of that navigator, in 1595, on the coast of Venezuela and at the mouths of the Oroonoko. Raleigh collected from Berrio, and from other prisoners made by Captain Preston * at the taking of Caraccas, all the

* These prisoners belonged to the expedition of Berrio and of Hernandez de Serpa. The English landed at Macuto (then Guayca Macuto), whence a white man, Villalpando, led them by a mountain path between Cumbre and the Silla
information which had been obtained at that period on the countries situate to the south of Vieja Guayana. He lent faith to the fables invented by Juan Martin de Albujar, and entertained no doubt either of the existence of the two lakes Cassipa and Ropunuwini, or of that of the great empire of the inca, which, after the death of Atahualpa, the fugitive princes were supposed to have founded near the sources of the Essequibo. We are not in possession of a map, that was constructed by Raleigh, and which he recommended to lord Charles Howard to keep secret. The geographer Hondius has filled up this void; and has even added to his map a table of longitudes and latitudes, among which figure the laguna del Dorado, and the ville impériale de Manoas*. Raleigh, when at anchor near the Punta del Gallo † in the island

(perhaps passing over the ridge of Galipano) to the town of Caraccas. (Simon, p. 594; Raleigh, p. 19.) Those only who are acquainted with the situation can be sensible, how difficult and daring this enterprise was.


† The northern part of la Punta de Icacos, which is the south-east cape of the island of Trinidad. There Christopher Columbus cast anchor, Aug. the 3d, 1498. A great confusion exists in the denomination of the different capes of the island of Trinidad; and as recently, since the expedition of Fidalgo and Churruca, the Spaniards reckon the longitudes
of Trinidad, made his lieutenants explore the mouths of the Oroonoko, principally those of
in South America west of la Punta de la Galera (lat. 10° 50',
long. 63° 20'). See my Observ. Astr., vol. i, p. 39.) it is im-
portant to fix the attention of geographers on this point. The
following is the result of my researches: Columbus called the
south-east cape of the island Punta Galera, on account of the
form of a rock "que desde lexos parecia galera que iba a la
vela." (History of the Admiral by his son Ferdinand Colum-
I, p. 80.) We see clearly by the narrative of Columbus, that
from Punta de la Galera he sailed to the west and landed at a
low cape, which he calls Punta del Arenal; this is our Pun-
ta de Icacos. In this passage, near a place (Punta de la
Playa) where he stopped to take in water (perhaps at the
mouth of the Rio Erin), he saw to the south for the first time, the
continent of America, which he called Isla Santa. It was
therefore the eastern coast of the province of Cumana, to the
east of the Cano Macareo, near Punta Redonda, and not the
mountainous coast of Paria (Isla de Gracia of Columbus),
which was first discovered. Columbus relates, that, after
having anchored near the Isloto del Gallo, now called El
Soldado, and having passed the Boca de Sierpe, between
Punta del Arenal and the continent, he sailed to the north
through the Golfo de la Balena (G. de Paria, Golfo triste,
G. de las Perlas), and saw the Boca de Dragos in that direc-
tion. On the maps of La Cruz (1775) and of Caulin (1778)
the south-east cape of Trinidad (lat. 10° 9') has continued to
be named, as by Columbus, Punta Galera; which is the
Punta Galeota of modern navigators. But already Hondius
(in the maps of 1598, Herera (Descripción de los Indios,
1615), Sanson (map of 1669), D'Anville, and all the modern
English and French geographers, with the exception of Bonne
(in the Atlas of Raynal), denote the north-east cape of the
Capuri*, Grand Amana (Manamo Grande), and Macureo (Macareo). As his ships drew a great deal of water, he found it difficult to enter the bocas chicas, and was obliged to construct flat-bottomed barks. He remarked the fires of the Tivitivas (Tibitibies), of the race of the Guaraon Indians, on the tops of the mauritia palm trees; and appears to have first brought the fruit† to Europe, fructum squamosum, similem palmae pini. I am surprised, that he scarcely mentions‡ the island of Trinidad (lat. 10° 50'), the spot which was falsely believed to have been the first seen by Columbus, by the name of Punta de la Galera.

* See above, p. 724, and 755, where I have given the topography of the delta of the Oroonoko. The name of Capure is now given to one of the bocas chicas, between the Pedernales and Macareo. The geographers of the 16th century were agreed to denote the Boca de Navios by this name. The narrative of Raleigh (p. 38-42) leaves much doubt on this subject. Is the word Capure significative? Raleigh (p. 72) gives this name to a northern branch of the Meta, which during more than half a century is found thus marked in all the maps of Sanson, and of those who copied him. Now this Rio Capuri, which flows out near the Cabruta, is, in my opinion, no other than the Rio Apure itself, called Apuri by the Indians. The Voari of Raleigh, a tributary stream of the Capuri, is probably the Rio Guaricu or Vari-cu of the Indians.

† See above, p. 535.

‡ He merely says (p. 46): "Those Spaniards which fled from Triniado, and also those that remained with Carapana in Emeria (now the mission of the Capuchins of Carony), were joined in some village upon the Orinoco."
settlement, which had been made by Berrio under the name of Santo Thomè (la Vieja Guayanà). This settlement however dates from 1591; and though, according to Fray Pedro Simon, "religion and policy prohibited all mercantile connection between Christians (Spaniards) and Heretics (the Dutch and English)," there was then carried on at the end of the 16th century, as in our days, an active contraband trade by the mouths of the Oroonoko. Raleigh passed the river Europa (Guarapalo), and "the plains of Saymas (Chaymas*), which extend, keeping the same level, as far as Cumana and Caraccas;" he stopped at Morequito (perhaps a little to the north of the site of the villa de Upata, in the missions of the Carony), where an old cacique confirmed to him all the reveries of Berrio on the irruption of foreign nations (Orejones and Epuremei) into Guyana. The Raudales or cataracts of the Caroli (Carony), a river which was at that period considered as the shortest way for reaching the towns of Macureguarai and Manoa, situate on the banks of lake Cassipa and of lake Rupunuwini or Dorado, put an end to this expedition.

Raleigh went scarcely the distance of sixty leagues along the Oroonoko; but he names the upper tributary streams, according to the vague

* See above, vol. iii, p. 221-77.
notions he had collected, the Cari, the Pao, the Apure (Capuri?), the Guarico (Voari?), the Meta*, and even, "in the province of Baraguan, the great cataract of Athule (Atares), which prevents all farther navigation." Notwithstanding Raleigh's exaggeration, so little worthy of a statesman, his narrative contains important materials for the history of geography. The Oroonoko, above the confluence of the Apure, was at that period as little known to Europeans, as in our times the course of the Niger below Sego.

* Raleigh distinguishes the Meta from the Beta, which flows into the Baraguan (the Oroonoko) conjointly with the Daune near Athule; as he also distinguishes the Casanare, a tributary stream of the Meta, and the Casnero, which comes from the south, and appears to be the Rio Cuchivero. All above the confluence of the Apure was then very confusedly known; and streams, that flow into the tributary streams of the Oroonoko, were considered as flowing into this river itself. The Apure (Capuri) and the Meta appeared long to be the same river, on account of their proximity, and the numerous branches by which the Aranca and the Apure join each other. Is the name of Beta perchance connected with that of the nation of Betoyes, of the plains of the Casanare and the Meta? Hondius, and the geographers who have followed him, with the exception of De L'Isle (1700), and of Sanson (1656), place the province of Amapaja erroneously to the east of the Oroonoko. We see clearly by the narrative of Raleigh (p. 26 and 72), that Amapaja is the inundated country between the Meta and the Guarico. Where are the rivers Dauney and Ubarro? The Guaviare appears to me to be the Goavar of Raleigh.
The names of several very remote tributary streams were known, but not their situation; and when the same name, differently pronounced, or not properly apprehended by the ear, furnished different sounds, their number was multiplied. Other errors had perhaps their source in the little interest, which Antonio de Berrio, the Spanish governor, felt in communicating true and precise notions to Raleigh; who indeed complains of his prisoner, "as being utterly unlearned, and not knowing the east from the west" (p. 28). I shall not here discuss the point, how far the belief of Raleigh, in all he relates of inland seas, similar to the Caspian sea; on "the imperial and golden city of Manoa," and on the magnificent palaces built by the emperor Inga of Guyana, in imitation of those of his ancestors at Peru, was real or pretended. The learned historian of Brazil, Mr. Southey, and the biographer of Raleigh, Sir G. Cayley, have recently thrown much light on this subject. It seems to me difficult to doubt of the extreme credulity of the chief of the expedition, and of his lieutenants. We see Raleigh adapted everything to the hypotheses he had previously formed. He was certainly deceived himself; but when he sought to influence the imagination of queen Elizabeth, and execute the projects of his own ambitious policy, he neglected none of the artifices of flattery. He described to the
Queen "the transports of those barbarous nations at the sight of her picture;" he would have "the name of the august virgin, who knows how to conquer empires, reach as far as the country of the warlike women of the Oroonoko and the Amazon;" he asserts, that, "at the period when the Spaniards overthrew the throne of Cuzco, an ancient prophecy was found, which predicted, that the dynasty of the Incas would one day owe it's restoration to Great Britain;" he advises, that, "on pretext of defending the territory against external enemies, garrisons of three or four thousand English should be placed in the towns of the Inca, obliging this prince to pay a contribution annually to Queen Elizabeth of three hundred thousand pounds sterling;" finally, he adds, like a man who foresees the future, that "all the vast countries of South America will one day belong to the English nation."

* "I shewed them her majesties picture which the Casi-gui so admired and honoured, as it had been easy to have brought them idolatrous thereof.—And I further remember that Berreo confessed to me and others (which I protest before the Majesty of God to be true), that there was found among prophecies in Peru (at such time as the Empire was reduced to the Spanish obedience) in their chiefest temples, amongst divers others which foreshewed the losse of the said Empyre, that from Inglaterra those Ingas should be again in time to come restored.—The Inga would yield to her Majesty by composition many hundred thousand pounds yearly as to
The four voyages of Raleigh to the Lower Oroonoko succeeded each other from 1595 to 1617. After all these useless attempts, the ardor of research for Dorado has greatly diminished. No expeditions have since been formed by a numerous band of colonists; but some solitary enterprises have been undertaken, and encouraged by the governors of the provinces. The notions, which were spread by the journeys of father Acunha in 1688, and father Fritz in 1637, to the auriferous land of the Manoas of Jurubesh, and to the Laguna de Oro*, contributed to renew the ideas of Dorado in the Portugueze and Spanish colonies north and south of the equator. At Cuenza in the kingdom of Quito, I met with some men, who were employed by the bishop Marfil, to seek at the east of the Cordilleras, in the plains of Macas, the ruins of the town of Logrono, which was believed to be situate in a country rich in gold. We learn by the journal of Hortsmann, which I have often
defend him against all enemies abroad and defray the expences of a garrison of 3000 or 4000 soldiers.—It seemeth to me that this Empyre of Guiana is reserved for the English nation.” (Raleigh, p. 7, 17, 51, 100.)

* See above, p. 312. I found, among the valuable collections of D'Anville preserved in the Archives of foreign affairs at Paris (No. 9545), a curious manuscript map, tracing the journey of father Fritz. Tabula geografica del Rio Marañon, 1690.
quoted, that it was supposed in 1740, *Dorado* might be reached from Dutch Guyana by going up the Rio Essequibo. Don Manuel Centurion, the governor of Santo Thomè del Angostura, displayed an extreme ardor for reaching the imaginary lake of Manoa. Arimuicaipi, an Indian of the nation of the Ipurucotoes, went down the Rio Carony, and, by false narrations, inflamed the imagination of the Spanish colonists. He showed them in the southern sky the clouds of Magellan, the whitish light of which he said was the reflexion of the argentiferous rocks situate in the middle of the Laguna Pari-ma. This was describing in a very poetical manner the splendour of the micaceous and talcky slates of his country! Another Indian chief, known among the Caribbees of Essequibo by the name of *captain Jurado*, vainly attempted to undeceive the governor Centurion. Fruitless attempts were made by the Caura and the Rio Paragua; and several hundred persons perished miserably in these rash enterprises, from which however geography has derived some advantages. Nicolas Rodriguez and Antonio Santos (1775—1780) were employed by the Spanish governor. Santos, proceeding by the Carony, the Paragua, the Paraguamusí, the Anocapra, and the mountains of Pacaraymo and Quimiropaca, reached the Uraricuera and the Rio Branco. I found some valuable informa-
tion in the journals of these perilous expeditions.

The maritime charts, which the Florentine traveller, Amerigo Vespucci*, constructed in the early years of the 16th century, as Piloto mayor of the Casa de Contratación of Seville, and in which he placed, perhaps artfully, the words Tierra de Amerigo, have not reached our times. The most ancient monument we possess of the geography of the New Continent† is the Map of the World by John Ruysch, annexed to a Roman edition of Ptolemy in 1508. We there find Yucatan and Honduras (the most southern part of Mexico‡) figured as an island, by the name of Culicar. There is no isthmus of Panama, but a passage, which permits of a direct navigation from Europe to India. The great southern island (South America) bears the name of Terra de Pareas, bounded by two rivers, the Rio La-reno, and the Rio Formoso. These Pareas are,

* He died in 1512, as Mr. Munoz has proved by the documents of the archives of Simancas. (Hist. del Nuevo Mundo, vol. i, p. 17.) Tiraboschi, Storia della Litteratura, vol. vi, Pl. 1. p. 179, 190.

† See the learned researches of Mr. Walckenaer, in the Bibliographie univ., vol. vi, p. 209, art. Buckinck. On the maps added to Ptolemy in 1506 we find no trace of the discoveries of Columbus.

‡ No doubt the lands between Yucatan, Cape Gracias a Dios, and Veragua, discovered by Columbus (1502 and 1503), by Solis, and by Pinaçon (1506).
no doubt, the inhabitants of *Paria*, a name which Christopher Columbus had already heard* in 1498, and which was long applied to a great part of America. Bishop Geraldini says clearly, in a letter addressed to pope Leo X in 1516, *insula illa, quæ Europa et Asia est major, quam indocti Continentem Asiae appellant, et alii Americam vel Pariam nuncupant*. I find in the Map of the World of 1508 no trace whatever of the Oroonoko. This river appears for the first time, by the name of *Rio dulce*, on the celebrated map constructed in 1529 by Diego Ribero, cosmographer of the emperor Charles V, which was published, with a learned commentary by Mr. Sprengel in 1795. Neither Columbus (1498), nor Alonzo de Ojeda, accompanied by Amerigo Vespucci (1499), had seen the real mouth of the Oroonoko; they confounded it with the northern opening of the gulf of Paria, to which they attributed, by an exaggeration so common to the navigators of that time, an immense volume of fresh water. It was Vicente Yanez Pinçon, who, after having discovered the mouth of the *Rio Maragnon†*, first saw (1500) that of the


† *Alexandri Geraldini Itinerarium*, p. 250.

‡ The name of *Marañon* was known fifty-nine years before
Oroonoko. He called this river *Rio dulce*; a name which, since Ribero, was long preserved on our maps, and which has sometimes been given erroneously to the Maroni, and to the Essequebo*.

The great lake Parima did not appear† on our maps till after the first voyage of Raleigh. It was Jodocus Hondius, who, as early as the year 1599, fixed the ideas of geographers, and figured the interior of Spanish Guyana as a country well known. He transformed the isthmus between the Rio Branco and the Rio Rupunuwini (one of the tributary streams of the Essequebo) into the lake *Rupunuwini, Parima, or Dorado*, two hundred leagues long, and forty

the expedition of Lopez de Aguirre; the denomination of the river is therefore erroneously attributed to the nickname of *marranos* (hogs), which this adventurer gave his companions in going down the river of the Amazons. Was not this vulgar jest rather an allusion to the Indian name of the river?

* See above, p. 478. The Oroonoko is also wanting on a very fine map, which bears the title of *Delineatio australis partis Americae, authore Arnaldo Florentio a Langern*. (D'Anville's Collection of Manuscripts, No. 9179.)

† I find no trace of it on a very rare map, dedicated to Richard Hakluyt, and constructed on the meridian of Toledo. (Novus Orbis, Paris 1587.) In this map, published before the voyage of Quiros, a group of islands is marked (*Infortunato Insulae*) where the Friendly Islands actually are. Ortelius (1570) already knew them. Were they islands seen by Magellan?
broad, and bounded by the latitudes of 1° 45' south, and 2° north. This inland sea, larger than the Caspian, is sometimes traced in the midst of a mountainous country, without communication with any river; and sometimes the Rio Oyapok (Waiapago, Japoc, Viapoco) and the Rio de Cayana are made to issue from it. The first of these rivers, confounded in the eighth article of the treaty of Utrecht with the Rio de Vicente Pinçon (Rio Calsoène of D'Anville) has been, even down to the late congress of Vienna, the subject of interminable discussions between the French and Portugueze diplomats. The second is an imaginary prolongation either of the Tonnegrande, or of the Oyac.

* See for instance, Hondius, Nieuwe Caerte van het goudrycke landt Guiana, 1599; and Sanson's Map of America, in 1656 and 1669.

† Brasilia et Caribana, Auct. Hondio et Huelsen, 1599.

‡ I have treated this question in a Mémoire sur la fixation des limites de la Guyane Française, written at the desire of the Portugueze government, during the negociations of Paris in 1817. (See Schoell, Archives polit., or Pièces inédites, vol. i, p. 48—58.) Ribero, in his celebrated map of the world of 1529, places the Rio de Vicente Pinçon south of the Amazon, near the gulf of Maranhao. This navigator landed at this spot, after having been at Cape Saint Augustin, and before he reached the mouth of the Amazon. Herera, Dec. I, p. 107. The narrative of Gomara, Hist. nat., 1553, p. 48, is very confused in a geographical point of view.

§ "Cajanae flumen longe altius penetrat in Continentem." (Laet, p. 640.) On comparing the maps of French Guy-
(Via ?). The inland sea (*Laguna Parime*) was at first placed in such a manner, that it's western extremity coincided with the meridian of the confluence of the Apure and the Oroonoko. By degrees it was advanced toward the east*, the western extremity being found to the south of the mouth of the Oroonoko. This change produced others in the respective situations of the lakes Parima and Cassipa, as well as in the direction of the course of the Oroonoko. This great river is represented as running, from it's delta as far as beyond the Meta, from south to north, like the river Magdalena. The tributary streams therefore, which were made to issue from the lake Cassipa, the Carony, the Arui, and the Caura, then took the direction of the latitude, while in nature they follow that of a meridian. Beside the lakes Parima and Cassipa, a third was traced upon the maps, from which the Aprouague (Apurwaca) was made to issue. It was then a general practice among geographers, to attach all the rivers to great lakes. By this means Ortelius joined the Nile to the Zaire or Rio Congo, and the Vistula to the Wolga and the Dnieper. North of Mexico, in the preana, we observe, since D'Anville, a great confusion in the denomination of the little rivers between the Aprouague and the Maroni.

* Compare the maps of 1599 with those of Sanson (1656) and of Blæuw (1633).
tended kingdoms of Quivira and Cibola, rendered celebrated by the falsehoods of the monk Marcos de Niza, a great inland sea was imagined, from which the Rio Colorado of California was made to issue*. A branch of the Rio Magdalena flowed to the Laguna de Maracaybo; and the lake of Xarayes, near which a *southern Dorado*† was placed, communicated with the Amazon, the Miari‡ (Meary), and the Rio de

* This is the *Mexican Dorado*, where it was pretended, that vessels had been found on the coasts (of New Albion?) loaded with the merchandize of Catayo and China (*Gomara Hist, Gen. p. 117*), and where Fray Marcos (like Huten in the country of the Omaguas) had *seen from afar* the gilded roofs of a great town, one of the *Siete Ciudades*. The inhabitants have great dogs, *en los quales quando se mudan cargan su menage*. (*Herera, Dec. VI, p. 157, 206.*) Later discoveries however leave no doubt, that there existed a centre of civilization in those countries. (See my Political Essay on New Spain, vol. i. p. 298, 310; vol. ii, p. 582:)

† *Herera, Descripcion de las Indias*, p. 53.

‡ As this river flows into the gulf of Maranhao (so named because some French colonists, Rifault, De Vaux, and Ravardiére, believed they were opposite the mouth of the Maragnon or Amazon), the ancient maps call the Meary Maragnon, or Maranham. (See the maps of Hondius, and Paulo de Forlani.) Perhaps the idea, that Pinçon, to whom the discovery of the real Maragnon is due, had landed in those parts, since become celebrated by the shipwreck of Ayres da Cunha, has also contributed to this confusion. The Meary appears to me identical with the *Rio de Vicente Pinçon of Diego Ribero*, which is more than one hundred and forty leagues from that of the modern geographers. (See above,
San Francisco. These hydrographic reveries have for the most part disappeared; but the lakes Cassipa and Dorado have been long simultaneously preserved on our maps.

In following the history of geography, we see the Cassipa, figured as a rectangular parallelogram, enlarge by degrees at the expense of the Dorado. While the latter is sometimes suppressed, no one ventures to touch the former*, which is the Rio Paragua (a tributary stream of the Caroni) enlarged by temporary inundations. When D'Anville learned from the expedition of Solano, that the sources of the Oroonoko, far from lying to the west, on the back of the Andes of Pasto, came from the east, from the mountains of Parima, he restored in the second edition of his fine map of America (1760) the Laguna Parime, and very arbitrarily made it to communicate with three rivers, the Oroonoko, the Rio Branco, and the Essequibo, by the Mazuruni and the Cujuni; assigning to it the latitude, from 3° to 4° north, which had till then been given to lake Cassipa.

p. 474.) At present the name of Maragnon has remained at the same time to the river of the Amazons, and to a province much farther eastward, the capital of which is Maranhao, or Saint Lewis de Maragnon.

* Sanson, Course of the Amazon, 1680; De L'Isle, Amérique Mérid., 1700. D'Anville, first edition of his America, 1748.
La Cruz Olmedilla, the Spanish geographer, followed, in 1775, the example set by D'Anville. The ancient lake Parima, situate under the equator, was entirely independant of the Oroonoko; the new, which appeared in the place of the Cassipa, and in the same form of a quadrilateral, the longest sides of which lie from south to north *, furnishes the most singular hydraulic communications. The Oroonoko, in the map of La Cruz, under the names of Parima and Puruma (Xuruma?), takes it's rise in the mountainous land between the sources of the Ventuari and of the Caura (in the latitude of five degrees, and in the meridian of the mission of Esmeralda), from a small lake called Ipava. This lake would be placed in my itinerary map to the north-east of the granitic mountains of Cunevo, a situation which sufficiently proves, that it might be the origin of a tributary stream of the Rio Branco or the Oroonoko, but not the origin of the Oroonoko itself. This Rio Parima, or Puruma, after a course of forty leagues east-north-east, and sixty leagues south-east, receives the Rio Mahu, which is already known to us as one of the principal branches of the Rio Branco; it then enters into the lake Parima, which is supposed to be thirty leagues long and twenty

* The greater axis of the real lake of Parima was from east to west.
From this lake three rivers immediately issue, the Rio Ucamu (Ocamo), the Rio Idapa (Siapa), and the Rio Branco. The Oroonoko, or Puruma, is indicated, as a subterraneous filtration, at the western back of the Sierra Mei, which skirts the lake or White Sea on the west. This second source of the Oroonoko is found in two degrees of north latitude, and thirty degrees and a half east of the meridian of Esmeralda. The new river, after a course of fifty leagues west-north-west, receives first the Ucamu, which issues from the lake Parima; and then the Rio Maquiritari (Padamo), which rises between the lake Ipava and another Alpine lake, called by La Cruz Laguna Cavija. The word lake being cavia in Maypure, the denomination of Laguna Cavia signifies, like Laguna Parime, simply a basin of water, Laguna de agua. This strange disposition of the rivers is become the type of almost all the modern maps of Guyana. A misunderstanding, founded on ignorance of the Spanish language, has contributed to give great authority to the map of La Cruz, in which some accurate notions are mingled with systematic ideas drawn from ancient maps. A dotted line surrounds the country, respecting which Solano was able to procure some information; and this line has been taken for Solano's route, who consequently would have seen the south-western extremity of the White Sea. We
read on the map of La Cruz, "this line points out what has been discovered and pacified by the governor of Caraccas, don Jose Solano." It is well known in the missions, that Solano never left Fernando de Atabapo, that he did not see the Oroonoko east of the Guaviari, and that he could obtain no information respecting those countries but from common soldiers, who were ignorant of the language of the natives. The work of Father Caulin, who was the historiographer of the expedition, the testimony of don Apollinario Diez de la Fuente, and the voyage of Santos, sufficiently prove, that no person has ever seen the White Sea of La Cruz; which, as the names of the tributary streams indicate, is an imaginary enlargement of the western branch of the Rio Branco above the confluence of the Tacutu and the Uraricuera or Rio Parima. But, even admitting facts, the falsehood of which is sufficiently proved in the present day, it could scarcely be conceived from the hydrographic principles generally adopted, by what right the lake Ipava could be called the source of the Oroonoko. When one river runs into a lake, and three others issue from it, we know not to which of these rivers we ought to give the name of the former. Much less can any motive justify the geographer in preserving the same name for a river, the source of which is separated from the lake by a lofty chain of
mountains, and which is supposed to be the effect of a subterraneous infiltration.

Four years after the celebrated map of La Cruz Olmedilla appeared the work of father Caulin, who had accompanied the expedition of the boundaries. This book was written on the banks of the Oroonoko itself, in 1759; and some notes were added subsequently in Europe. The author, a monk of the Observance of Saint Francis, is distinguished by his candor, and by a spirit of criticism superior to that of all his predecessors. He did not go himself beyond the Great Cataract of Atures, but all that Solano and Ituriaga had collected, whether true or doubtful, was at his disposal. Two maps, traced by father Caulin in 1756, were reduced in 1778 into one, and completed, according to pretended discoveries, by Mr. de Surville, one of the keepers of the archives in the secretary of state's office. I have already observed, in speaking of our abode at Esmeralda, the point nearest the unknown sources of the Oroonoko, how arbitrary these alterations were. They were founded on the false reports, by which the credulity of the governor Centurion and of don Apollinario Diez de la Fuente, a cosmographer destitute of instruments, knowledge, and books, was daily flattered.

The journal of father Caulin is in perpetual contradiction with the map prefixed to it. The
author develops the circumstances, that gave rise to the fable of the lake Parima; but the map restores this lake, placing it however far from the sources of the Oroonoko, to the east of the Rio Branco. According to father Caulin, the Oroonoko is called Rio Maraguaca in the meridian of the granitic mountain of this name, which is figured on my itinerary map. "It is rather a torrent than a river; issuing conjointly with the Rio Omaguaca and the Macoma, in two degrees and a half of latitude, from the little lake Cabiya (Manomaname in Cabre, Caricha in Guaypunabi)." It is this lake, which La Cruz designated as the source of the Maquiriritari (Padamo), and placed in latitude of five degrees and a half to the north of lake Ipava. The existence of the Rio Macoma of Caulin appears to be founded on a confused idea of the Padamo, the Ocamo, and the Matacona, which, before my travels, were believed to communicate together. Perhaps also the lake, from which the Mavaca issues (a little to the west of the Amaguaca), has given rise to these errors on the origin of the Oroonoko, and the neighbouring sources of the Idapa *

Surville substitutes for the lake Parime of La Cruz another lake in the latitude of 2° 10', which he regards as the source of the Ucamu (Ocamo).

* Caulin. p. 51—82 See above, p. 376 and 558.
Near this alpine lake rise from the same source the Oroonoko and the Rio Idapa, a tributary stream of the Cassiquiare. The lake Amucu, the source of the Mahu, is enlarged into the Mar Dorado, or Laguna Parime. The Rio Branco is no longer connected, except by two of its smallest tributary streams, with the basin, from which the Ucamu issues. It results from this arrangement, altogether hypothetical, that the origin of the Oroonoko is in no lake, and that its sources are entirely independant of lake Parime and the Rio Branco. Notwithstanding the bifurcated source, the hydrographic system of Surville's map is less absurd, than that which is traced on the map of La Cruz. If modern geographers have so long persisted in following the Spanish maps, without comparing them together, we may at least be surprised, that they have not given the preference to the most modern map, that of Surville, published at the expense of the king, and by order of the minister for India, don Jose de Galvez.

I have now stated, as I announced above, the variable forms which geographical errors have assumed at different periods. I have explained what in the configuration of the soil, the course of the rivers, the names of the tributary streams, and the multiplicity of the portages, may have given rise to the hypothesis of an inland sea in the centre of Guyana. However dry discus-
sions of this nature may appear, they ought not to be regarded as steril and fruitless. They show travellers what remains to be discovered; and make known the degree of certainty, which long-repeated assertions may claim. It is with maps, as with those tables of astronomical positions, which are contained in our ephemerides, designed for the use of navigators: the most heterogeneous materials have been employed in their construction during a long space of time; and, without the aid of the history of geography, we could scarcely hope to discover at some future day on what authority every partial statement rests.

Before I resume the thread of my narrative, it remains for me to add a few general reflexions on the auriferous lands situate between the Amazon, and the Oroonoko. We have just shown, that the fable of Dorado, like the most celebrated fables of the nations of the ancient world, has been applied progressively to different spots. We have seen it advance from the south-west to the north-east, from the oriental declivity of the Andes towards the plains of Rio Branco and the Essequebo, an identical direction with that in which the Caribbees for ages conducted their warlike and mercantile expeditions. It may be conceived, that the gold of the Cordilleras might be conveyed from hand to hand, through an infinite number of tribes, as
far as the shore of Guyana; since, long before the fur-trade had attracted English, Russian, and American vessels to the north-west coast of America, iron tools had been carried from New Mexico and Canada beyond the *Stony Mountains*. From an error in longitude, the traces of which we find in all the maps of the 16th century, the auriferous mountains of Peru and New Grenada were supposed to be much nearer the mouths of the Oroonoko and the Amazon, than they are in fact. Geographers have the habit of augmenting and extending beyond measure countries that are recently discovered. In the map of Peru published at Verona by Paulo di Forlani, the town of Quito is placed at the distance of 400 leagues from the coast of the South Sea, on the meridian of Cumana; and the Cordillera of the Andes there fills almost the whole surface of Spanish, French, and Dutch Guyana*. This erroneous opinion

*La Descrittione di tutto il Peru. In this very scarce map Cumana is situate fifty leagues in land; the town of Quito in four degrees of south latitude; Pasto in the meridian of Surinam; and Cuzco south-west of Quito. A small alpine lake, which I saw between Otavalo and the Villa de Ibarra is marked on the spot where the Laguna de Parime is placed in modern maps. When the Spaniards began to penetrate into Guyana, proceeding from the east, the names of places near the South Sea were transferred toward the west. Sanson also (1669) calls the country between the Meta and the Guaviare the Province of Paria.
of the breadth of the Andes has no doubt contributed to give so much importance to the granitic plains, that extend on their eastern side. Unceasingly confounding the tributary streams of the Amazon with those of the Oroonoko*, or (as the lieutenants of Raleigh called it to flatter their chief) the Rio Raleana, to the latter were attributed all the traditions, which had been collected respecting the Dorado of Quixos, the Omaguas, and the Manaos†. The geographer

* The Amazon was confounded with the Oroonoko at the same period when other geographers distinguished between the Amazon, the Orellana, and the Maraggon. "Fluvius Orenoque Andalusiam novam a Gujana dirimens, alias ab Hispanis Orellana vocatus fuit." (Blaeuw, p. 17.)

† In the map of P. du Val d'Abbeville (No. 9561 of D'Anville's collection, preserved in the archives of the Ministry of Foreign Affairs), we read, near the lake Parime, Orejones (nobles of Peru), and Establishment of the Incas. See also Description générale de l'Amérique par Pierre d'Auvy, seigneur de Montmartin, revue par J. B. de Rocoles, 1660, p. 136.) The flight of Manco-Inca, brother of Atahualpa, to the east of the Cordilleras, no doubt gave rise to the tradition of a new empire of the Incas in Dorado. It was forgotten, that Caxamarca and Cuzco, two towns where the princes of that unfortunate family were at the time of their emigration, are situate to the south of the Amazon, in the latitudes of seven degrees eight minutes and thirteen degrees twenty-one minutes south, and consequently four hundred leagues southwest of the pretended town of Manoa on the lake Parima (three degrees and a half north lat.). It is probable, that, from the extreme difficulty of penetrating into the plains east of the Andes covered with forests, the fugitive princes never
Hondius supposed, that the Andes of Loxa, celebrated for their forests of cinchona, were
gone beyond the banks of the Beni. The following is what I learnt with certainty respecting this emigration of the family of the Inca, some sad vestiges of which I saw on passing by Caxamarca. *Manco-Inca*, acknowledged as the legitimate successor of Atahualpa, made war without success against the Spaniards. He retired at length into the mountains and thick forests of Vilcabamba, which are accessible either by Huamanga and Antahuaylla, or by the valley of Yucay north of Cusco. Of the two sons of *Manco-Inca*, the eldest, *Sayri-Tupac*, surrendered himself to the Spaniards, upon the invitation of the viceroy of Peru, Hurtado de Mendoza. He was received with great pomp at Lima, was baptized there, and died peaceably in the fine valley of Yucay. The youngest son of Manco-Inca, *Tupac-Amaru*, was carried off by stratagem from the forests of Vilcabamba, and beheaded on pretext of a conspiracy formed against the Spanish usurpers. At the same period, thirty five distant relations of the Inca Atahualpa were seized, and conveyed to Lima, in order to remain under the inspection of the *Audiencia*. (Garcilasso, Vol. 2, p. 194, 480, and 501.) It is interesting to inquire, whether any other princes of the family of Manco-Capac have remained in the forests of Vilcabamba, and if there still exist any descendants of the Incas of Peru between the Apurimac and the Beni. This supposition gave rise in 1741 to the famous rebellion of the Chuneoes, and to that of the Amajes and Campoes led on by their chief, Juan Santos, called the false Atahualpa. The late political events of Spain have liberated from prison the remains of the family of Jose Gabriel Condorcanqui, an artful and intrepid man, who, under the name of the Inca *Tupac-Amaru*, attempted in 1781 that restoration of the ancient dynasty, which Raleigh had projected in the time of queen Elizabeth.
only twenty leagues distant from the lake Parima, or the banks of the Rio Branco. This proximity procured credit to the tidings of the flight of the Inca into the forests of Guyana, and the removal of the treasures of Cuzco to the easternmost parts of that country. No doubt in going up toward the east, either by the Meta or by the Amazon, the civilization of the natives, between the Puruz, the Jupura, and the Iquiari, was observed to increase. They possessed amulets, little idols of molten gold, and chairs sculptured with art; but these traces of dawning civilization are far distant from those cities and houses of stone described by Raleigh and those who followed him. We have made drawings of some ruins of great edifices east of the Cordilleras, when going down from Loxa toward the Amazon, in the province of Jaen de Bracamoros; and thus far the Incas had carried their arms, their religion, and their arts. The inhabitants of the Oroonoko were also, before the conquest, when abandoned to themselves, somewhat more civilized than the independant hordes of our days. They had populous villages along the river, and a regular trade with more southern nations; but nothing indicates, that they ever constructed an edifice of stone. We saw no vestige of any during the course of our navigation.

Though the celebrity of the riches of Spanish
Guyana is owing for the most part to the geographical situation of the country, and the errors of the ancient maps, we are not justified in denying the existence of any auriferous land in that extent of country of eighty-two thousand square leagues, which stretches between the Oroonoko and the Amazon, on the east of the Andes of Quito and New Grenada. What I saw of this country between two and eight degrees of latitude, and sixty-six and seventy-one degrees of longitude, is entirely composed of granite, and of a gneiss passing into micaceous and talcous slate. These rocks appear naked in the lofty mountains of Parima, as well as in the plains of the Atabapo and the Cassiquiare. The granite prevails there over the other rocks; and, though in both continents the granite of ancient formation is pretty generally destitute of gold-ore, we cannot thence conclude, that the granite of Parima contains no vein, no stratum of auriferous quartz. On the east of the Cassiquiare, toward the sources of the Oroonoko, we saw the number of these strata and these veins increase. The granite of these countries, by it's structure, it's mixture of hornblende, and other geological features alike important, appears to me to belong to a more recent formation, perhaps posterior to the gneiss, and analogous to the stanniferous granites, the hyalomictes, and the pegmatites. Now the least
ancient granites are also the least destitute of metals; and several auriferous rivers and torrents in the Andes, in the Salzbourg, Fichtelgebirge, and the tableland of the two Castiles, lead us to believe, that these granites sometimes contain native gold, and portions of auriferous pyrites and galena disseminated throughout the whole rock, as is the case with tin, and magnetic and micaceous iron. The group of the mountains of Parima, several summits of which attain the height of one thousand three hundred toises*, was almost entirely unknown before our visit to the Oroonoko. This group however is a hundred leagues long, and eighty broad; and though wherever Mr. Bonpland and I traversed this vast group of mountains, its structure seemed to us extremely uniform, it would be wrong to affirm, that it may not contain very metalliferous transition rocks and micaslates superimposed on the granite.

I have already observed, that the silvery luster and frequency of mica have contributed to give Guyana great celebrity for metallic wealth. The peak of Calitamini, glowing every evening

* The loftiest mountains, which have hitherto been measured in Brazil, are only nine hundred toises high; such are, Itacolumi, in the Capitania of Minas-Geraes (near Villa rica), the Serra d'Itambe, the Serra de Caras, &c. See the excellent memoirs of M. d'Eschwege. (Journ. von Brasilien, 1818, Vol. 1, p. 213).
at sunset with a reddish fire, still attracts the attention of the inhabitants of Maypures *. It is the islets of micaslate, situate in lake Amucu, which according to the fabulous stories of the natives augment by their reflexion the lustre of the nebulae of the southern sky†. "Every mountain," says Raleigh, "every stone in the forests of the Oroonoko, shines like the precious metals; if it be not gold, it is madre del oro." This navigator asserts, that he brought back gangues of auriferous white quartz ("harde white sparr"); and to prove the richness of this ore, he gives an account of the assays, that were made by the officers of the mint at London‡. I have no reason to believe, that the chemists of that time sought to lead queen Elizabeth into error, and I will not insult the memory of Raleigh by supposing, like his contemporaries§, that the auriferous quartz, which he brought home, had not been collected in America. We cannot judge of things from which we are separated by a long interval of time. The gneiss of the littoral chain|| contains traces of the precious

* See above, p. 167.
† See above, p. 838.
‡ Messrs. Westewood, Dimocke, and Bulmar.
§ See the defence of Raleigh, in the preface to the Discovery of Guiana, 1596, p. 2—4.
|| In the southern branch of this chain, which passes by Yusma, Villa de Cura, and Ocumare; particularly near
metals; and some grains of gold have been found in the mountains of Parima, near the mission of Encaramada. How can we infer the absolute sterility of the primitive rocks of Guyana from testimony merely negative, from the circumstance, that during a journey of three months we saw no auriferous vein appearing above the soil?

In order to bring together whatever may enlighten the government of this country on a subject so long disputed, I shall enter into a few more general geological considerations. The mountains of Brazil, notwithstanding the numerous traces of imbedded ore which they display between Saint Paul and Villarica, have furnished hitherto only stream-works of gold. More than six sevenths of the seventy-eight thousand marks* of this metal, which at the beginning of the 19th century America has annually furnished to the commerce of Europe, have come, not from the lofty Cordillera of the Andes, but from the alluvial lands on the east and west of the Cordilleras. These lands are raised but little above the level of the sea, like those of Sonora in Mexico, and of Choco and Barbacoas in New Grenada; or they stretch along in tablelands, as in the interior of Bra-

Buria, los Teques, and los Marietus. See above, Vol. iii, p. 525, 529.

* Value 65,878,000 francs.
Is it not probable, that some other deposits of auriferous earth extend toward the northern hemisphere, as far as the banks of the Upper Oronoko and the Rio Negro, two rivers which form but one basin with that of the Amazon? I observed, when speaking of the Dorado de Canelas, the Omaguas, and the Iquiare, that almost all the rivers, which flow from the west, wash down gold in abundance, and very far from the Cordilleras. From Loxa to Popayan these Cordilleras are composed alternately of trachytes and primitive rocks. The plains of Zamora, of Logrono, and of Macas (Sevilla del Oro), the great Rio Napo with its tributary streams† (the Ansupi and the Coca,

* The height of Villarica is six hundred and thirty toises; but the great tableland of the Capitania de Minas Geraes has only three hundred toises of absolute height. See the profile, which Colonel d’Eschwege has published at Weimar, with an indication of the rocks, in imitation of my profile of the Mexican tableland.

† The little rivers Cosanga, Quixos, and Papallacta or Maspa, which form the Coca, rise on the eastern slope of the Nevado de Antisana. The Rio Ansupi brings down the largest grains of gold; it flows into the Napo, south of the Archidona, above the mouth of the Misagualli. Between the Misagualli and the Rio Coca, in the province of Avila, five other northern tributary streams of the Napo (the Siguna, Munino, Suno, Guataracu, and Pucuno) are known as being singularly auriferous. These local details are taken from several manuscript reports of the governor of Quixos, from which I traced the map of the countries situate to the east of the Antisana.
in the province of Quixos), the Caqueta de Mocoa as far as the mouth of the Fragua, in fine, all the country comprised between Jaen de Bracomoros and the Guaviare*, preserve their ancient celebrity for metallic wealth. More to the east, between the sources of the Guainia (Rio Negro), the Uaupes, the Iquiare, and the Yurubesh, we find an incontestibly auriferous soil. There Acunha and father Fritz placed their Laguna del Oro; and various accounts, which I obtained at San Carlos from Portugueze Americans, explain perfectly what La Condamine has related of the plates of beaten gold found in the hands of the natives. If we pass from the Iquiari to the left bank of the Rio Negro, we shall enter a country entirely unknown between the Rio Branco, the sources of the Essequebo, and the mountains of Portugueze Guyana. Acunha speaks of the gold washed down by the northern tributary streams of the Lower Maragnon, such as the Rio Trombetas (Oriximina), the Curupatuba, and the Ginipape (Rio de Paru). It appears to me a circumstance worthy of attention, that all these rivers descend from the same tableland, the northern slope of which contains the lake Amucu, the Dorado of Raleigh and the Dutch, and the isthmus between the Rupunuri (Rupunuwini) and the Rio Mahu. Nothing opposes our admitting, that there are

* From Rio Santiago, a tributary stream of the Upper Maragnon, to the Llanos of Caguan and of San Juan.
auriferous alluvial lands far from the Cordilleras of the Andes, on the north of the Amazon; as there are on the south, in the mountains of Brazil. The Caribbees of the Carony, the Cuyuni, and the Essequebo have practised on a small scale the washing of the alluvial earth from the remotest times*. When we examine the structure of mountains, and embrace in one point of view an extensive surface of the globe, distances disappear, and places the most remote draw near each other insensibly. The basin of the Upper Oroonoko, the Rio Negro, and the Amazon, to which I have consecrated the whole of the eighth book of my work, is bounded by the mountains of Parime on the north, and by those of Minas-Geraes, and Matogrosso on the south. The opposite slopes of the same valley often display an analogy in their geological relations.

I have described in this and the preceding volume the vast provinces of Venezuela and Spanish Guyana. While examining their natural limits, their climate, and their productions, I have discussed the influence produced by the configuration of the soil on agriculture, commerce, and the more or less rapid progress of society. I have successively passed over the three regions that succeed each other from north to south; from the Mediterranean of the West

* See note A, at the end of this volume.
Indies to the forests of the Upper Oroonoko and of the Amazon. The fertile land of the shore, the centre of agricultural riches, is succeeded by the steppes, inhabited by pastoral tribes. These steppes are in their turn bordered by the region of forests, the inhabitants of which enjoy, I will not say liberty, which is always the result of civilization, but a savage independance. On the limit of these two latter zones the struggle now exists, which will decide the emancipation and future prosperity of America. The changes which are preparing cannot efface the individual character of each region; but the manners and condition of the inhabitants will assume a more uniform colour. This consideration perhaps adds an interest to a tour, made in the beginning of the 19th century. We like to see traced in the same picture the civilized nations of the shore, and the feeble remains of the natives of the Oroonoko, who know no other worship than that of the powers of nature; and who, like the Germans of Tacitus, *deorum nominibus appellant secretum illud, quod solá reverentía vident.*
NOTE TO BOOK THE EIGHTH.

NOTE A.

"On the north of the confluence of the Curupatuba with the Amazon," says Acunha (p. 40), "is the mountain of Paraguaxo, which, when illumined by the sun, glows with the most beautiful colours; and thence from time to time issues a horrible noise (revienta con grandes estruernos)." Is there a volcanic phenomenon in this eastern part of the New Continent? or is it the love of the marvellous, which has given rise to the tradition of the bellowings (bramidós) of Paraguaxo? The lustre emitted from the sides of the mountain recalls to mind what we have mentioned above of the micaceous rocks of Calitarnini, and the island Ipomucena, in the pretended lake Dorado. In one of the Spanish letters intercepted at sea by Captain George Popham, in 1594, it is said, "Having inquired of the natives, whence they obtained the spangles and powder of gold, which we found in their huts, and which they stick on their skin by means of some greasy substances, they told us, that, in a certain plain, they tore up the grass, and gathered the earth in baskets, to subject it to the process of washing." (Raleigh, p. 109.) Can this passage be explained by supposing, that the Indians sought thus laboriously, not for gold, but for spangles of mica, which the natives of Rio Caura still employ as an ornament, when they paint their bodies?

END OF VOL. V.
ERRATA.
Vol. IV.
Page 225, add as a note to gelatine, l. 10, Philos. Trans. 1800, p. 163.
466, l. 7 from bottom, for Panama, read Panapana.
550, ... 2 ................. Uruana. ... Carichana.
Vol. V.
216, ... 11 ........ for Aroma ...... read ... Aramo.
309, ... 7 ........ estacamentos ...... destacamento.
312, ... 10 ...... west ............ east.
17 ........ north-east ........ north-west.
This volume terminates the second volume (in Quarto) of the Personal Narrative. Each volume of this work appears in two parts; to the last will be annexed a very copious Table of Contents, in which the physical and geological observations will be methodically arranged. It may not be amiss, to take this opportunity of stating, that eighteen volumes of the large edition of the *Voyage to the Equinoctial Regions of the New Continent* have now appeared, eleven of which are in quarto. There remain to be published, 2 Vols. (in quarto) of the Personal Narrative, 1 Vol. of Zoology, 2 Vols. of the *Nova Genera et Species Plant. equin.* the *Magentical Observations*, and the new edition of the *Geography of Plants*.

The sketches of maps cited in the discussion on lake Parima,(p. 839 to 859 of the present volume), will appear in the next number of the Geographical Atlas. The map of the Rio Grande de la Magdalena, containing a considerable part of New Grenada, is the result of the astronomical observations and barometric measurements, which I made during a navigation of sixty-five days. I drew this map on a very large scale, in the month of August, 1801, during my residence at Santa-Fe de Bogota. It is the first map of the River Magdalena constructed astronomically. Copies of it were left in the hands of the viceroy, and of the celebrated botanist, Mr. Mutis; other copies were sent to Carthagena and to Spain. Having given this map to be engraved in 1816, I could not avail myself of the topographic particulars of the islands and the sinuosities of the river, which are found in the Spanish map published at London, in the month of September, 1820, by lieutenant-colonel Don Vicente Talledo, entitled, *Mapa corográfico de la Provincia de Cartagena de Indias.* This curious map comprehends the half of the Rio Magdalena, from it's mouth as far as the Strait of Carare. The court of Madrid, informed of my geographical labors, by the viceroy, don Pedro de Mendinueta, was desirous of having the degree of their precision ascertained on the spot,
Mr. Talledo, and a skilful pilot, Mr. Alvarez, were appointed in 1804, to take the plan of the Magdalena from the mouth as far as Honda. I know, that they made use, like me, of sextants, and artificial horizons; but I am ignorant whether they were also furnished with chronometers. The map of the province of Carthagena by Mr. Talledo is the result of these long and useful operations. I had marked on the drawing, copies of which were left at New Grenada, a table of latitudes and longitudes, determined between Turbaco and Santa-Fe de Bogota. In examining these particular points on Mr. Talledo’s map, the following comparison is the result:

<table>
<thead>
<tr>
<th>PLACES.</th>
<th>MAP of Mr. de Humboldt, drawn at Santa-Fe, in 1801.</th>
<th>MAP of Mr. Talledo, taken in 1804.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Lat.</td>
<td>Long.</td>
</tr>
<tr>
<td>Turbaco</td>
<td></td>
<td>0° 6'</td>
</tr>
<tr>
<td>Mahates</td>
<td></td>
<td>0° 22'</td>
</tr>
<tr>
<td>Island of Cotoreo</td>
<td>1° 39'</td>
<td>1° 37'</td>
</tr>
<tr>
<td>Pinto</td>
<td>9° 25'</td>
<td>0° 58'3/4</td>
</tr>
<tr>
<td>Mompox</td>
<td>9° 14'</td>
<td>1° 8'</td>
</tr>
<tr>
<td>Badillas (Vadillo)</td>
<td>7° 58'</td>
<td>1° 41'</td>
</tr>
<tr>
<td>Island of Bruxas</td>
<td>6° 55'</td>
<td>1° 42'</td>
</tr>
<tr>
<td>Carare</td>
<td>6° 11'</td>
<td>1° 5'</td>
</tr>
</tbody>
</table>

This agreement in the results is so much the more remarkable, as it comprises every point of which I fixed the longitude from Turbaco to Nare. Does it prove the exactness of my labours? or has Mr. Talledo (without any indication of it on his map) preferred my observations to his own? If the latter be the case, I regret that he adopted calculations made provisionally in 1801, instead of the positions published by
Mr. Oltmanns and me in 1811, in my Collection of Astronomical Observations, Vol. 1, p. 20. A more profound examination of the declination of the southern stars, and of the rate of the chronometer, necessarily modified the latitudes and longitudes a little; so that on the map engraved in 1816, by Mr. Michaelis, the longitudes of Pinto and the Island of Bruxas are 0° 47' and 1° 34'. The profile of the land between Honda and the tableland of Bogota is founded on the barometric observations, which I have published in my Nivellement des Andes, No. 64-130.

ALEXANDRE DE HUMBOLDT.

Paris, March, 1821.