

P R O O F S
OF THE
THEORY OF THE EARTH.

ARTICLE XI.

Of Seas and Lakes.

THE dry land is every where surrounded by the ocean; it penetrates, sometimes by large openings, and sometimes by small straits, into the interior parts of different countries, and forms mediterranean seas, some of which are affected by the motion of the tides, and others not. We shall, in this article, trace the ocean through all its windings; and, at the same time, give an enumeration of the mediterranean seas, which we shall endeavour to distinguish from what are called bays or gulfs, and lakes.

The sea that washes the western coasts of France, forms a gulf between Spain and Brittany. This gulf is, by navigators, called the Bay
of

of Biscay: It is very open, and advances farthest into the land between Bayonne and St. Sebastian. It likewise advances considerably at Rochelle and Rochefort. This bay begins at Cape Ortegal, and terminates at Brest, where a strait commences between the south point of Brittany and the Lizard Point. This strait, which is at first pretty wide, forms a small bay on the coast of Normandy, the most advanced point of which is at Auranche. It continues pretty large till it arrives at the channel of Calais, where it is very narrow; it then suddenly enlarges, and terminates between the Texel and the coast of Norwich: At the Texel, it forms a small shallow mediterranean called *Zuidersee*, and several large gaps or advances, the waters of which are not of a considerable depth.

After this, the ocean forms a large bay called the *German Sea*, which commences at the northernmost point of Scotland, and runs along the east coast of Britain the length of Norwich; and from thence to the Texel, along the coasts of Holland and Germany, of Jutland and Norway, as far as Bergen. This bay may even be considered as a mediterranean; for the Orkney islands nearly shut up its mouth, and seem, by their direction, to be a continuation of the mountains of Norway. It forms a large strait, which commences at the south point of Norway, and continues pretty broad to the island of Zeland, where it suddenly contracts, and forms, between

the coasts of Sweden and the islands of Denmark and Jutland, four small straits; after which, it widens to a small bay, the most advanced point of which is at Lubeck; from thence, to the south extremity of Sweden, it continues pretty broad; then it enlarges more and more, and forms the Baltic, which is a mediterranean sea, extending, from south to north, near 300 leagues, if the gulf of Bothnia, which is a continuation of it, be comprehended. In the Baltic are two bays, that of Livonia, the most advanced point of which is near Mittau and Riga, and that of Finland, which is a branch of the Baltic, extending between Livonia and Finland to Petersburg, and communicating with Lake Ladoga, and even with Lake Onega, which joins the White Sea by means of the river Onega. The whole body of water which forms the Baltic, the gulfs of Bothnia, of Finland, and of Livonia, ought to be regarded as an immense lake, supported by a great number of rivers, as the Oder, the Vistula, the Niemen, the Droine in Germany and Poland; by other rivers in Livonia and Finland, by others still more considerable which come from Lapland, as the Tornea, the Calis, the Lulea, the Pithea, the Uma; and by several from Sweden. These rivers, which, in general, are large, amount to more than 40, including those which fall into them, and cannot fail to convey a quantity of water sufficient to supply the Baltic. Besides, there are no tides in the Baltic, and its

water

water has very little saltiness: And if the situation of the land, and the number of lakes and marshes in Finland and Sweden, which are contiguous to the Baltic, be taken into consideration, we shall be inclined to regard it not as a sea, but as a great lake formed by the waters which it receives from the adjacent countries, and which have forced for themselves a passage near Denmark into the ocean, into which, according to the relation of voyagers, it still continues to run.

From the commencement of the bay which goes by the name of the German Sea, and which terminates beyond Bergen, the ocean follows the coasts of Norway, Swedish Lapland, North Lapland, and Muscovite Lapland, at the eastern part of which it forms a large strait, and gives rise to the mediterranean called the White Sea, which may also be considered as a great lake; for it receives twelve or thirteen large rivers, which are more than sufficient to supply it with water; and its water contains but little salt. Besides, it very nearly, in several places, communicates with the Baltic; and it has an evident communication with the gulf of Finland; for, in ascending the river Onega, we arrive at a lake of the same name, which is joined by two rivers to Lake Ladoga; and this last communicates by a large branch with the gulf of Finland; and there are, in Swedish Lapland, several places from which the waters run almost indifferently either into the White Sea or into the gulfs of

Bothnia

Bothnia and of Finland. This whole country is full of lakes and marshes, and, therefore, it seems probable, that the Baltic and White Seas were the receptacles of its waters, and that, in time, they discharged themselves into the German and Frozen Seas.

On leaving the White Sea, and coasting the island of Candenos, and the north of Russia, the ocean advances a small arm into the land at the mouth of the river Petzora. This arm, which is about 40 leagues in length, by 8 or 10 in breadth, may rather be regarded as a collection of water formed by the river, than as a gulf of the sea; for it also contains very little salt. In this place the land runs out in a promontory terminated by the small islands of Maurice and of Orange; and between this promontory and the neighbouring land to the south of Waigat's strait, there is a bay of about 30 leagues long, which belongs to the ocean, and is not formed by rivers. This is succeeded by Waigat's strait, which lies nearly under the 70th degree of north latitude; it is not above 8 or 10 leagues in length, and it communicates with the sea which washes the north coasts of Siberia. As this strait is blocked up with ice during the greatest part of the year, it is very difficult to penetrate into the sea beyond it. This passage has been tried in vain by many navigators; and those who succeeded have not given us exact charts of the sea, which they call the Pacific Sea.

Sea. By the most recent charts, and by the best globes, it appears, that this sea may be only a mediterranean, having no connection with the great sea of Tartary; for it seems to be shut up and bounded to the south by the country of the Samoides, which is now well known, and which extends from the Straits of Waigat to the mouth of the river Jenisca: To the east, it is bounded by Jelmorland; to the west by Nova Zembla; and, though we know not the extent of this sea to the north and north-east, as the land seems not to be interrupted, it is probable that the Pacific Sea is only a mediterranean; and that it is bounded by land, and has no communication on that side with the ocean. What establishes this fact is, that, in departing from the Straits of Waigat, the whole west and north coasts of Nova Zembla, the length of Cape Desire, have been traversed; that, from this Cape, the coasts of Nova Zembla have been traced to a small bay about the 75th degree, where some Dutchmen passed a dreadful winter in 1596; and that, beyond this gulf, the land of Jelmorland was discovered in 1664, which is separated from Nova Zembla only by a few leagues of land; so that the only land unknown is a small spot near this little bay just now described; and this spot exceeds not, perhaps, 30 leagues in length. If, therefore, the Pacific Sea joins with the eastern ocean, it must be by means of this small bay, which is the only way by which this mediterranean

ranean can have any communication with the eastern ocean. And, even on the supposition that such a communication existed, as this bay lies in the 75th degree of latitude, it would be necessary, to gain this open sea, to keep five degrees farther north. It is apparent, therefore, that, in attempting a north passage to China, it is better to sail beyond Nova Zembla to the 77th or 78th degree, where the sea is more open and clearer of ice, than to persist in passing the frozen straits of Waigat, when it is even uncertain whether the sea beyond them has any communication with the eastern ocean.

The coast has been traced from Nova Zembla and Jelmorland to the mouth of the Chotanga, which is about the 73d degree; beyond which an unknown coast extends about 200 leagues. We only know, from the Russians who travelled by land into these climates, that the country is not interrupted; and, in their charts, the rivers are delineated, and they called the inhabitants *Populi Palati*. This interval of unknown coast extends from the mouth of the Chotanga to that of Kauvoina, in the 66th degree of latitude. The bay of Linchidolin, in which the Russians fish whales, advances farthest into the land at the mouth of the Len, which is a considerable river. This bay is very open, and pertains to the sea of Tartary.

From the mouth of the Len, the northern coast of Tartary runs about 500 leagues east-

ward to a peninsula inhabited by a people called Schelates. It is the most northern point of Tartary, and lies under the 72d degree of latitude. In this extent of 500 leagues, the ocean forms neither bays nor arms; only from the peninsula of the Schelates, to the mouth of Korvinea, there is a considerable elbow or projection. This point is the eastern extremity of the north coast of the Old Continent, and Cape North in Lapland is the western extremity. Thus, we have of northern coast from Cape North in Lapland, to the extremity of the country of the Schelates, an extent of 1700 leagues, including the sinuosities of bays; and it measures about 1100 leagues in a straight line.

Let us next take a survey of the eastern coasts of the Ancient Continent. We shall begin at the extreme point of the country of the Schelates, and descend towards the equator. The ocean first makes a turn between the country of the Schelates and that of the Tschutsché, which last projects considerably into the sea. To the south of this country, there is a small open bay, called the bay of Suchoikret. This bay is succeeded by another, which advances, like an arm, about 40 or 50 leagues into the land of Kamtschatka: after which the ocean flows in, by a narrow strait, full of small islands, between the southern point of Kamtschatka and the northern point of the land of Jesso, and forms a large mediterranean, which we shall now describe in detail.

tail. It consists of the sea of Kamtschatka, in which there is a considerable island, called the island of *Amour*. An arm of this sea runs north-east. But, both this arm and the sea of Kamtschatka may, at least in part, be formed by the rivers which flow into it from the lands of Kamtschatka, and those of Tartary. However this matter stands, the sea of Kamtschatka communicates, by a very long strait, with the sea of Corea, which is another part of this mediterranean; and the whole together, extending more than 600 leagues in length, is bounded, on the west and north, by the lands of Corea and Tartary; and, on the east and south, by those of Kamtschatka, Jesso, and Japan, without having any other communication with the ocean than by the strait between Kamtschatka and Jesso; for it is uncertain whether the communication between Japan and the land of Jesso, though laid down in some charts, has a real existence; and, even supposing it did exist, the sea of Kamtschatka and that of Corea would still be regarded as forming together a great mediterranean, separated on all sides from the ocean, and not as a bay; for it communicates not with the ocean by its southern strait, but with the Chinese Sea, which is rather a mediterranean than a bay.

In the preceding article, it was remarked, that the sea had a constant motion from east to west; and that, consequently, the great Pacific Ocean

is making continual efforts against the eastern coasts. An accurate examination of the globe will confirm the conclusions we have drawn from this observation; for it appears, that from Kamtschatka to New Britain, discovered by Dampier in 1700, and which lies in the 4th or 5th degree of south latitude, the ocean has encroached on these coasts to the extent of 400 leagues; and, of course, that the eastern bounds of the Old Continent stretch not so far as they did formerly; for, it is remarkable, that New Britain and Kamtschatka, which are the most advanced lands to the east, lie under the same meridian. Besides, all countries extend farthest from north to south. Kamtschatka makes a point of about 160 leagues from north to south, and this point, the eastern coast of which is washed by the Pacific Ocean, and the other by the mediterranean above described, is divided from north to south by a chain of mountains. The lands of Japan and of Jesso form another territory between the ocean and the sea of Corea, extending from north to south more than 400 leagues; and the direction of the chains of mountains in Jesso and Japan must be from north to south; because, in this direction, they extend 400 leagues; but, from west to east, they exceed not 50 or 60. Thus, Kamtschatka, Jesso, and the eastern part of Japan, ought to be considered as contiguous lands, lying in a direction from north to south: and, following the

the same direction, we find, after the point of Cape Ava in Japan, the island of Barnevelt, and three other islands, situated in a line from north to south, and extending about 100 leagues. We next meet with three islands, called Callanos, and, after these, the Ladron islands, to the number of 14 or 15, all stretched in a line from north to south, the whole occupying a space of 300 leagues in length; and the broadest part of these islands, from east to west, exceeds not 8 leagues. From these facts, I am led to conclude, that Kamtschatka, Jessô, the east part of Japan, the islands of Barnevelt, the Callanos, and the Ladrones, are a continuation of the same chain of mountains, and the remains of an ancient country, which has been gradually corroded and covered with the sea. All these countries appear to be nothing but mountains, of which the islands are the peaks or points, the low-lands being occupied by the ocean. Hence, what is related in the *Lettres Edifiantes* must be true; and, in fact, a number of islands, called the New Philippines, has been discovered in the very situation in which P. Gobien supposed them to lie: and it cannot be doubted, that the most easterly of these New Philippines are a continuation of the chain of mountains which compose the Ladrones; for these eastern islands, to the number of eleven, lie in a line from north to the south, extending in length more than 200 leagues; and, in breadth,

breadth, the largest of them exceeds not eight leagues.

But these conjectures may seem too bold, on account of the great distances between the islands in the neighbourhood of Cape Ava, of Japan, and of the Callanos, between these islands and the Ladrones, and between the Ladrones and the New Philippines, the first interval being about 160 leagues, the second 50 or 60, and the third near 120. But it ought to be considered, that chains of mountains often extend much farther below the waters of the ocean; and that these intervals are nothing when compared to the extent of land, from south to north, in these islands or mountains, which, beginning at the interior part of Kamtschatka, is more than 1100 leagues. But, though this idea concerning the quantity of land gained by the ocean on the eastern parts of the Old Continent, and the continuation of the mountains, should be rejected, still it must be acknowledged, that Kamtschatka, Jessô, Japan, the islands of Rois, Formosa, Vaif, Batha, Babuyane, Lucca, Mindano, Gilolo, &c. and, lastly, New Guinea, which extends to New Britain, and is situated under the same meridian as Kamtschatka, form a stretch of country of more than 2200 leagues, with small interruptions, the greatest of which exceeds not, perhaps, 20 leagues; so that the ocean has scooped out an immense bay from the interior parts of the eastern continent, which begins at Kamtschatka,

Schatka, and terminates at New Britain. This bay is interspersed with numerous islands, and has all the appearances of being gained from the land. It is, therefore, probable, that the ocean, by its constant motion from east to west, has gradually gained this great tract of country from the continent, and has formed several mediterraneans, as those of Kamtschatka, of Corea, of China, and perhaps the whole Indian Archipelago; for the land and water are so blended together in this region, that it evidently appears to have been a large country destroyed by inundations, of which only the eminences and mountainous parts are now to be seen, the lower grounds being entirely concealed under the waters of the ocean. This hypothesis is farther confirmed by the shallowness of the sea, and the figures of the innumerable islands, which seem to be nothing but the tops of mountains.

If we take a more particular survey of these seas, we shall find, that the northern part of the Chinese sea forms itself into a great bay, which begins at the island of Fungma, and terminates at the frontiers of the province of Pekin, about 50 leagues from this capital of the Chinese empire. The most advanced and narrowest part of this bay is called the gulf of Changi. It is probable that this gulf, and part of the sea of China, are encroachments of the ocean, and that the islands above described are the most elevated

parts of the ancient country. Farther south are the bays of Tonquin and of Siam, in the neighbourhood of which is the peninsula of Malacca, consisting of a long chain of mountains, that run from north to south; and the Andaman islands, which form another chain of mountains, in the same direction, seem to be only a continuation of those of Sumatra.

The ocean afterwards forms the great bay of Bengal; where it may be remarked, that the land of the peninsula of Indus makes a concave curve, towards the east, nearly resembling the great bay of the eastern continent, which seems to have been produced by the same cause, namely, the motion of the sea from east to west. In this peninsula are the mountains of Gates, which extend from north to south; and the island of Ceylon appears to have been separated from this part of the continent.

The Maldiva islands are only another chain of mountains stretching from north to south. Then follows the Arabian gulf, which sends off four branches or arms; the two largest are on the west coasts, and the two smallest on the east. The first arm on the east coast is the bay of Cambaia, which extends not above 50 or 60 leagues; but it receives two considerable rivers, the Tapta and the Baroché or Mehi. The second arm or bay on the same coast is remarkable for the rapidity and height of its tides, which alternately advance and retreat more than

50 leagues. Into this bay fall several rivers, as the Indus, the Padar, &c. which have brought down sand and mud in such quantities as to elevate the bottom of the bay, and reduce it nearly to a perfect level. It is owing to this circumstance that the tides extend to so great a distance. The first arm on the west coast is the Persian gulf, which advances into the land above 250 leagues; and the second is the Red Sea, which, reckoning from the island of Socotora, extends above 680 leagues. From the straits of Ormuz and of Babelmandel, these two arms should be considered as mediterranean seas: they are both, indeed, subjected to a flux and reflux; but this circumstance is occasioned by their vicinity to the equator, where the tides rise higher than in other climates. Besides, they are both very long and very narrow. The motion of the tides is more rapid in the Red Sea than in the Persian gulf; because the former is nearly three times as long, and equally narrow, as the latter; neither does it receive any river capable of resisting the tide: but the Persian gulf receives three large rivers at its most advanced extremity. It is apparent, that the Red Sea has been formed by an irruption of the ocean; for the situation and similarity in the direction of the coasts on each side of the straits of Babelmandel show, that this passage has been cut by the waters.

At the extremity of the Red Sea lies that famous strip of land called the Isthmus of Suez, which

which is a barrier to the junction of the Red Sea with the Mediterranean. In the preceding article, I gave the reasons which render it probable that the Red Sea is higher than the Mediterranean, and that, if the Isthmus were cut, an inundation and increase of the latter would be the consequence. It may here be added, that, though the superior elevation of the Red Sea should not be allowed, yet it is incontestible, that there are no tides in the Mediterranean near the mouths of the Nile. It is equally certain, that the tides in the Red Sea rise several feet; and this circumstance alone, on the supposition of the removal of the Isthmus, would occasion a great influx of water from the Red Sea into the Mediterranean. Besides, Varenus, in his geography*, remarks, ‘Oceanus Germanicus, qui est Atlantici pars, inter Frisiam et Hollandiam se effundens, efficit sinum, qui, etsi parvus sit respectu celeberrimorum sinuum maris, tamen et ipse dicitur mare, alluitque Hollandiæ emporium celeberrimum, Amstelodamum. Non procul inde abest lacus Harlemensis, qui etiam mare Harlemense dicitur. Hujus altitudo non est minor altitudine sinus illius Belgici, quem diximus, et mittit ramum ad urbem Leidam, ubi in varias fossas divaricatur. Quoniam itaque nec lacus hic, neque sinus ille Hollandici maris inundant adjacentes agros, (de naturali constitutione loquor, non ubi tempestatibus

* Page 100.

urgenter, propter quas aggeres facti sunt;) patet inde, quod non sint altiores quam agri Hollandiæ. At vero Oceanum Germanicum esse altiores quam terras hæc, experti sunt Leidenses, cum suscepissent fossam seu alveum ex urbe sua ad Oceani Germanici littora, prope Cattorum vicum perducere, (distantia est duorum milliarium) ut, recepto per alveum hunc mari, possent navigationem instituire in Oceanum Germanicum, et hinc in varias terræ regiones. Verumenimvero, cum magnam jam alvei portam perfecissent, desistere coacti sunt, quoniam tum demum per observationem cognitum est, Oceani Germanici aquam esse altiorē quam agrum inter Leidam et littus Oceani istius: Unde locus ille, ubi fodere desierunt, dicitur *Het malle Gat*. Oceanus itaque Germanicus est aliquantum altior quam sinus ille Hollandicus, &c. As the German ocean, therefore, is higher than the sea of Holland, nothing prevents us from believing that the Red Sea may be higher than the Mediterranean. Herodotus and Diodorus Siculus mention a canal of communication between the Nile, the Mediterranean, and the Red Sea: And M. de l'Isle, in 1704, published a map, where he has laid down the termination of a canal in the east branch of the Nile, which he imagined to be a part of the canal which formerly joined that river to the Red Sea*. We meet with the same opinion

* See Mem. de l'Acad. des Sciences, année 1704.

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in a book entitled *Connoissance de l'Ancien Monde*; where the author, copying Diodorus Siculus, informs us, that this canal was begun by Neco King of Egypt; that Darius King of Persia continued the work; that it was finished by Ptolemy II. who conducted it to the city of Arsinoæ; and that it could be shut and opened at pleasure. I pretend not to deny these facts; but, I confess, they appear to be doubtful. I suspect, that the violence and height of the tides in the Red Sea, would necessarily communicate their influence to the waters of the canal: At least, it would require great precaution to prevent inundations, and to keep the canal in proper repair. Though we are told by historians that this canal was begun and finished, they are silent as to its duration; and the remains of it, which are pretended still to exist, are perhaps the only parts of it that ever were executed. This branch of the ocean has been denominated the *Red Sea*, because, wherever there are madrepores or corals at the bottom, the water of it has the appearance of being red. The following description of it is given in the *Histoire Generale des Voyages**: 'Before leaving the Red Sea, D. Jean inquired into the causes which induced the ancients to give it this appellation: He recollected, that Pliny had delivered several opinions concerning the origin of this name. Some derived it from a King of that

* Tom. i. p. 198.

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country called *Erythros*, which, in the Greek language, signifies *Red*: Others imagined that the red colour was occasioned by the reflection of the sun from the surface of the water; and others affirmed that the water itself was red. The Portuguese, who had made several voyages in that sea, alledged, that the whole coast of Arabia was remarkably red; and that the dust and sand carried into the sea by the winds tinged the water with the same colour.

Dom Jean, who examined the nature of the water and of the coasts, through their whole extent, with the most scrupulous attention, assures us, that the waters of this sea have no peculiarity in their colour; and that the dust and sand, not being red themselves, could not possibly communicate this colour to the water. The land on each side, he observes, is generally brown; in some places, it is black, and, in others, white: At Suaquem, the coasts of which the Portuguese never visited, there are three mountains striped with red; but they consist of hard rocks, and the neighbouring ground is of the usual colour.

The truth is, that this sea is all of the same uniform colour, of which any man may satisfy himself by drawing water from different parts. But, it must be acknowledged, that, in some places, it appears, by accident, to be red, and, in others, green and white. This phenomenon

phenomenon admits of the following explication. From Suaquem to Kossir, which is an extent of 136 leagues, the sea is filled with banks and rocks of coral; they are so called from their resembling coral in form and colour so exactly, that it is difficult to perceive the distinction: There are two kinds of them, the one is white, and the other extremely red. In many places, they are covered with a kind of gum, or viscid substance of a green colour, and sometimes of a deep orange. Now, the water of this sea is so transparent, that the bottom is visible at the depth of twenty fathoms, especially from Suaquem to the extremity of the gulf; and hence the water assumes, in appearance, the colour of the bodies which it covers. When, for example, the rocks are overlaid with a green gum, the water above them appears to be green; when the bottom is sand alone, the superincumbent water seems to be white; and, when the rocks are covered with coral, the water above them appears to be reddish. But, as the rocks of this colour are more frequent than the green or white, Dom Jean concludes, that the Arabic Gulf has, from this circumstance, obtained the name of the Red Sea. He was the more satisfied with this discovery, because the method he employed in the investigation of it left no room for hesitation or doubt. In such places as were not deep enough to allow his vessel to sail, he fastened

'pinks opposite to the rocks; and the sailors were enabled to execute his orders, at more than half a league from the rocks, without being immersed above the middle of their bodies. In those places where the water appeared red, the greatest part of the stones and pebbles they brought up were of the same colour; where the water appeared green, the stones were green also; and where the water appeared white, the bottom was a pure white sand.'

From the entrance to the Red Sea, at Cape Gardafu, to the Cape of Good Hope, the direction of the coast is pretty equal, and the sea forms no bay of any note. There is, indeed, a small scoop on the coast of Melinda, which, if the Island of Madagascar were united to the continent, might be considered as a part of a large bay. This island, it is true, though separated by the straits of Mozambique, appears to have formerly belonged to the continent; for, in this strait, there are high sands of great extent, especially on the Madagascar coast, which render the open part of it very narrow.

From the Cape of Good Hope to Cape Negro, on the west coast of Africa, the land lies in the same direction; and the whole of it seems to be a chain of mountains: It is, at least, a very elevated country; and, though more than 500 leagues in length, it is furnished with no rivers of any consideration, except one or two, which are known no farther than their mouths.

mouths. But the coast, above Cape Negro, makes a large curve; and the land, along this curve, appears to be lower than that of the rest of Africa: It is watered by several great rivers, the largest of which are the Coanza and the Zaire. From Cape Negro to Cape Gonfalez, are the mouths of 24 considerable rivers; and the space between these two capes, reckoning along the shore, is about 420 leagues. We would be tempted to think, that the ocean has encroached on these low lands of Africa, not by its natural motion from east to west, which could have no influence in producing this effect, but by the facility with which it might have undermined and surmounted them. From Cape Gonfalez to Cape Trois-pointes, the ocean forms an open bay, which presents nothing remarkable, except a very advanced point nearly in the middle of it, called *Cape Formosa*: It likewise contains, in the southern part of it, the islands of Fernandpo, St. Thomas, and Prince's Island. These islands appear to be a continuation of a chain of mountains situated between Rie del Rey, and the river Jamcer. From Cape Trois-pointes to Cape Palmas, the ocean runs a little in upon the land; and from Cape Palmas to Cape Tagrin, there is nothing worthy of remark. But, beyond Cape Tagrin, there is a small bay in the country of Sierra-Leona; and a little farther, there is another, in which are situated the islands of Bisagas. We afterwards

wards meet with Cape Verd, which projects far into the sea, and of which the islands of the same name appear to be a continuation; or, rather, they seem to be a continuation of Cape Blanc, which is a more elevated country, and stretches still farther into the ocean. We next come to a mountainous and dry coast, which commences at Cape Blanc, and terminates at Cape Bajador: The Canary islands seem to be a continuation of these mountains. Lastly, between Africa and Portugal, is a large open bay, in the middle of which are the celebrated Straits of Gibraltar. The ocean pours its waters, with great rapidity, through this strait into the Mediterranean. This sea runs into the interior parts of the land near 900 leagues, and gives rise to many objects worthy of remark. 1st, It has no perceptible tides, except in the Gulf of Venice; and a small flux and reflux have been alleged to take place at Marseilles and on the coast of Tripoli. 2^d, It contains many large islands, as Sicily, Sardinia, Corsica, Cyprus, Majorca, &c. and Italy, which is one of the most extensive peninsula's in the world: It is likewise adorned with a rich Archipelago, or rather, it is from the Mediterranean Archipelago that all other collections of islands have acquired that appellation. But this Archipelago appears to belong more properly to the Black Sea than to the Mediterranean; and it is probable, that the country of Greece was partly covered with the Black Sea, which

which runs into the sea of Marmora, and from that into the Mediterranean.

It has been alledged, that a double current runs through the Straits of Gibraltar; one superior, which carries the waters from the ocean into the Mediterranean, and another inferior, which carries the waters from the Mediterranean back to the ocean. But this notion is false, and contrary to the known laws of hydrostatics. Opposite currents have been ascribed to several other straits, as the Bosphorus, the straits of Sunda, &c.; and Marfilli has related many experiments tending to prove the existence of a superior and inferior current in the Bosphorus. These experiments, however, must have been fallacious; for such a phenomenon is repugnant to the nature and motion of fluids. Besides, Greaves, in his *Pyramidographie*, has demonstrated by accurate experiments, that there are no opposite currents in the Bosphorus. Marfilli and others may have been deceived by the regorging of the water near the shores, which takes place in the Bosphorus, in the straits of Gibraltar, and in all rapid rivers, and which often produces a motion opposite to that of the principal current.

Let us now briefly run over the coasts of the New Continent. We shall begin with Cape Hold-with-hope, which is situated in the 73^d degree of North Latitude. This is the most northerly point of land in New Greenland, and

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is distant from Cape North in Lapland about 160 or 180 leagues. From this cape the coast of Greenland might be traced to the polar circle, where the ocean forms a large strait between Iceland and Greenland. Some maintain, that this country in the neighbourhood of Iceland is not the Ancient Greenland, formerly possessed by the Danes as a dependent province. Its inhabitants were civilized Christians, who had bishops, churches, and a number of towns proportioned to their trade. The Danes had a communication with them as easy, and as frequent, as the Spaniards with the Canary islands: There still exists, it is said, laws and regulations with regard to the government of this province, and these not of a very ancient date. However, without forming any conjectures how this country came to be absolutely lost, we find not in New Greenland the least vestige of what is here related. They are mere savages: They have no buildings: There is not a word in their language that has the smallest affinity to the Danish tongue; and there is not a single circumstance from which we can infer it to be the same country. It is even almost a desert, and is covered with snow and ice the greatest part of the year. But, as these lands are of vast extent, and, as the coasts have been little frequented by modern navigators, they may have missed the place occupied by the descendants of those polished people; or the increase of the ice

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in this sea may now, perhaps, prevent all access to them. If, however, maps can be trusted, the whole coast of this country is known: It forms a large peninsula, at the extremity of which are the two straits of Frobisher and of Friesland, where the cold is excessive, although they are not farther north than the Orkneys, that is, about 60 degrees.

Between the west coast of Greenland, and that of Labrador, the ocean forms a gulf, and then a large mediterranean, which is the coldest of all seas, and its coasts are little known. In pursuing this gulf, we meet with Davis's strait, which leads to the Christian sea, which last terminates in Baffin's bay, through which there appears to be an outlet into Hudson's bay. The strait of Cumberland, which, like that of Davis, may lead into the Christian sea, is more narrow, and more subject to be frozen. Hudson's strait, though much farther south, is also frozen for some part of the year: And it is remarkable, that the tides are very high in those seas and straits, although no tides take place in the inland seas of Europe, as the Baltic and Mediterranean. This difference seems to be occasioned by the motion of the sea from east to west; which produces high tides in straits opposite to the current of the waters, or whose mouths open to the east. But, in those of Europe, which open to the west, there are no tides. The ocean, by its general movement, rushes into the former, but

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flies from the latter; and this is the reason why the tides are so violent in the seas of China, Corea, and Kamtschatka.

In sailing down Hudson's bay towards Labrador, there is a narrow opening, 30 leagues of which Davis traversed in 1586, and traded with the inhabitants. But no attempts have hitherto been made to discover the whole of this arm of the sea. We know nothing of the neighbouring country, but the land of the Esquimaux. Fort Pon-chartrin is the only settlement, and the most northerly part of this country; and it is separated from the island of Newfoundland by the small strait of Belleisle, which is little frequented. As the eastern coast of Newfoundland has the same direction with that of Labrador, this island appears to have been formerly a part of the continent, in the same manner as Isle-royal seems to have been detached from Acadia. The bottoms of the great bank, and of the lesser banks on which the cod-fishery is carried on, are not deep; but, as they shelve a great way under water, they produce violent currents. Between Cape Breton and Newfoundland, there is a pretty large strait, which is the mouth of a small mediterranean, called the *Gulf of St. Lawrence*. It sends off a branch, which extends a considerable way into the country, and appears to be only the mouth of the river of that name. In this arm of the sea the tides are very perceptible; and, even at
Quebec,

Quebec, which is farther up the country, the waters rise several feet. Leaving the gulf of St. Laurence, and following the coast of Acadia, we meet with a small gulf called *Boston-Bay*, which is of a square figure, and advances a little way only into the land. But, before we pursue this coast any farther, it is worthy of remark, that, from Newfoundland to Guiana, the ocean forms an immense bay, that runs in upon the land as far as Florida, which is more than 500 leagues. This bay is similar to that of the Old Continent above described, where the ocean, after forming a large gulf between Kamtschatka and New Britain, gives rise to a great mediterranean, which comprehends the sea of Kamtschatka, of Corea, of China, &c. In the same manner, in the New Continent, the ocean, after forming a large gulf between Newfoundland and Guiana, gives rise to a great mediterranean, extending from the Antilles to Mexico; which confirms what we have advanced concerning the motion of the sea from east to west: For it appears that the ocean has gained as much territory on the east coast of America as on the east coast of Asia. Besides, these great gulfs in each continent lie under the same degrees of latitude, and are nearly of equal extent. Such singular relations, it would appear, must have been produced by the same cause.

If we examine the position of the Antilles, beginning with the island of Trinidad, which is
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the southmost, it is impossible to doubt but that Trinidad, Tobago, the Granades, St. Vincent, Martinico, Marygalante, Antego, Barbadoes, and all the adjacent isles, once formed a chain of mountains, which extended from south to north, like Newfoundland and the country of the Elquinaux. Farther, the direction of the Antilles from east to west, if we begin with Barbadoes, and pass on to St. Bartholomy, Portorico, St. Domingo, and Cuba, is nearly the same with the coasts of Cape Breton, Acadia, and New England. All these islands lie so contiguous, that they may be regarded as a continued belt of land, and as the most elevated parts of a country now occupied by the sea. Most of them are nothing but the tops of mountains; and the sea between them and the continent is a true mediterranean, in which the tides are not much more perceptible than in our Mediterranean, although the straits between the islands are directly opposed to the motion of the sea from east to west, which should contribute to raise the tides in the gulf of Mexico. But, as this gulf is very broad, the waters elevated by the tide when expanded over a large surface, hardly produce any sensible change upon the coast of Louisiana and several other places.

Both the Old and New Continents, therefore, appear to have been encroached upon by the ocean in the same latitudes: Both are furnished with a great mediterranean, and a vast number
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of islands, which likewise lie nearly in the same latitudes. The only difference is, that the Old Continent, being much larger than the New, has a mediterranean on its west coast, to which the New Continent has nothing analogous. But both seem to have undergone similar revolutions. These revolutions are greatest near their middle parts, or between the tropics, where the motion of the sea is most violent.

The coasts of Guiana, from the mouth of the river Oronoko to that of the Amazons, exhibit nothing remarkable. But the Amazons, which is the largest river in the universe, forms a considerable sheet of water near Coropa, before it discharges itself into the sea by the two mouths which surround the island of Caviana. From the mouth of the Amazons to Cape St. Roche, the river runs almost straight east; from Cape St. Roche to Cape St. Augustine it runs south, and from Cape St. Augustine to the bay of All Saints, it runs westward in such a manner that this part of Brasil projects considerably into the ocean, which is directly opposite to a similar projection of the African coast. The bay of All Saints is a small arm of the sea, which advances about 50 leagues into the land, and is much frequented by navigators. From this bay to Cape St. Thomas, the coast runs straight south, and from thence, in a south-west direction, to the mouth of the Plata, where an arm of the sea projects about 100 leagues into the land.

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From this river, to the southern extremity of America, the ocean forms a large bay, which is terminated by Falkland Island, Cape Assumption, and other lands bordering on Terra del Fuego. At the bottom of this bay is the strait of Magellan, the longest in the universe, and where the tides rise very high. Beyond this is the strait of La Maire, which is much shorter; and, *lastly*, Cape Horn, which is the south point of America.

On the subject of points or head-lands, it is remarkable, that they all regard the south, and that most of them are cut by straits which run from east to west. The point of South America regards the Arctic Pole, and it is cut by the strait of Magellan: That of Greenland, which likewise has a southern aspect, is cut from east to west by the strait of Frobisher: That of Africa regards also the south, and, beyond the Cape of Good Hope, are banks and shoals which appear to have been separated from it: That of the peninsula of India is cut by the strait between it and the island of Ceylon; and, like all others, projects southward. These are facts; but we are unable to give any explication of them.

From Terra del Fuego, all along the west coast of South America, the ocean makes considerable advances into the land; and this coast seems to follow exactly the direction of the high mountains which traverse this part of the continent from

from south to north, from the Equator to the Arctic Pole. Near the Line, the ocean forms as large bay, extending from Cape St. Francois. to Panama, that famous isthmus, which, like that of Suez, prevents the junction of the two seas. If these two necks of land were removed, both the Old and the New Continent would be divided into two distinct portions. From Panama to California, there occurs nothing worthy of remark. Between the peninsula of California and New Mexico, is a long arm of the ocean, called the *Vermilion Sea*, which is more than 200 leagues long. In fine, the west coast of California has been traced to the 43d degree of latitude. It was in this latitude that Drake, who first discovered the land to the north of California, and which he called *New Albion*, was obliged, by the rigour of the cold, to change his course, and to anchor in a small bay which bears his name; so that the countries beyond the 43d or 44th degree, in this part of the globe, are as little known as those of North America beyond the 48th degree, which is inhabited by the Moozemleki, and the 51st, which is inhabited by the Assiniboils. The territory of the former savages extends much farther west than that of the latter. All beyond, for 1000 leagues in length, and as much in breadth, is totally unknown, unless the Russians, as they pretend, have made some discoveries by departing from

of Kamtschatka, and visiting the eastern coasts of North America.

The ocean, then, surrounds the whole globe, without interruption, and we may sail round it by taking our departure from the south point of America. But we are still uncertain whether the ocean surrounds, in the same manner, the north part of the globe; and all the navigators, who have attempted to go from Europe to China by the north-east or north-west, have equally failed in their enterprises.

Lakes differ from mediterraneans; the former derive no water from the ocean; on the contrary, when they communicate with seas, they are constantly discharging water into them. Thus the Black Sea, which some geographers have regarded as a branch of the Mediterranean, and, of course, as an appendage of the ocean, is only a lake; because, in place of receiving any supplies from the Mediterranean, its waters run with rapidity through the Bosphorus into the lake called the Sea of Marmora, and from thence through the straits of the Dardanelles into the Grecian Sea. The Black Sea is about 250 leagues long, and 100 broad: It receives a number of large rivers, as the Danube, the Nieper, the Don, the Boh, the Donjee, &c. The Don, which unites with the Donjee, before it arrives at the Black Sea, forms a lake called the *Palus Meotis*, which is more than 100 leagues in length, and from 20 to 25 in breadth. The Sea

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of Marmora, which is below the Black Sea, is a lake smaller than the *Palus Meotis*, being not above 50 leagues long, and 8 or 9 broad.

It is related by some of the ancients, and particularly by Diodorus Siculus, that the Euxine, or Black Sea, was originally a great river or lake, and had no communication with the Greek Sea; but that its waters were, in the course of time, so greatly augmented by the rivers which fall into it, that they forced a passage, first by the islands of Cyanea, and then by the Hellespont. This opinion has great probability on its side; and, I think, it is no difficult matter to explain how the operation was effected: For, supposing the bottom of the Black Sea to have been formerly much lower than it is now, the mud and sand carried down by the rivers would gradually raise it, till the surface of the water was elevated above that of the land, and then the water would necessarily find a passage for itself: and, as the rivers continue still to transport sand and earth, and as, at the same time, the quantity of water in the rivers diminishes in proportion as the mountains from which they spring are lowered, it may happen, in the course of ages, that the Bosphorus will again be filled up. But, as effects of this nature depend on many causes, we must content ourselves with simple conjectures: Mr. Tournefort, on the authority of the ancients, says, that the Black Sea, which receives the waters of a great part of Eu-

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rope and Asia, after being considerably augmented, opened to itself a passage by the Bosphorus, and either formed the Mediterranean, or increased its waters to such a degree, that they forced a passage to the ocean through the straits of Gibraltar; and that the island of Atlantis, mentioned by Plato, was, on this occasion, totally overflowed. This notion cannot be supported; for the ocean runs into the Mediterranean, and not the Mediterranean into the ocean. Besides, M. Tournefort has not combined two essential facts, though he has mentioned both of them. The first is, that the Black Sea receives 9 or 10 rivers, each of which furnishes more water than is discharged by the Bosphorus; and the second, that the Mediterranean does not receive more water from rivers than the Black Sea, though it be seven or eight times larger; and what it receives from the Bosphorus is not the tenth part of what falls into the Black Sea. How, therefore, could this tenth part of the water that falls into a small sea, produce not only a larger sea, but augment its waters to such a degree as would enable it to break down the isthmus of Gibraltar, and overwhelm an island of greater extent than the whole of Europe? It is easy to perceive that M. Tournefort has not sufficiently considered this matter. The Mediterranean derives from the ocean at least ten times the quantity of water it receives from the Black Sea; for the narrowest part of the Bosphorus

Bosphorus exceeds not 800 paces, while that of the straits of Gibraltar is more than 5000; and supposing the velocities of both to be equal, still the water in the straits of Gibraltar is by much the deepest.

M. Tournefort, who ridicules Polybius for predicting that the Bosphorus will in time be filled up, has not attended sufficiently to circumstances, otherwise he would not have pronounced the impossibility of such an event. Must not the Black Sea, which constantly receives the sand and mud of eight or ten large rivers, gradually fill up? Must not the winds and the natural current of the waters continually transport part of these matters into the Bosphorus? It is, therefore, extremely probable, that, in the course of ages, the Bosphorus will be choaked up, when the quantity of water discharged by the rivers into the Black Sea shall be greatly diminished. Now, the rivers are diminishing daily, because the mountains, which collect the dews, and give rise to the rivers, are continually decreasing.

The Black Sea receives more water from rivers than the Mediterranean; and M. Tournefort observes, on this subject, 'That the greatest rivers in Europe fall into this sea by means of the Danube, into which are discharged the rivers of Suabia, Franconia, Bavaria, Austria, Hungary, Moravia, Corinthia, Croatia, Bochnia, Servia, Transylvania, and Wallachia: the rivers of Black Russia and of Podolia fall like-

' wife into the same sea by means of the Nießer;
 ' those of the southern and eastern parts of Po-
 ' land, of the northern part of Muscovy, and of
 ' the country of the Cossacks, fall into it, either
 ' by the Nieper or Boristhenes; the Tanais and
 ' the Copa empty themselves into the Black Sea
 ' by the Cimmerian Bosphorus; the rivers of
 ' Mingrelia, the principal of which is the Phasis,
 ' also discharge their contents into this sea, and
 ' likewise the Cafalmac, the Sangaris, and other
 ' rivers of Asia Minor which take a northern
 ' course; but the discharge through the Thra-
 ' cian Bosphorus, which is the only outlet from
 ' the Black Sea, is not comparable to that of
 ' any one of these great rivers *.'

All these facts demonstrate the great quantity
 of water carried off by evaporation; and it is
 owing to this circumstance that the ocean con-
 stantly runs into the Mediterranean by the straits
 of Gibraltar. It is difficult to ascertain the quan-
 tity of water received by any sea; it requires an
 exact knowledge of the breadth, depth, and ve-
 locity of all the rivers that fall into it, of their
 augmentation and diminution in different sea-
 sons of the year, and of the quantity which the
 sea loses by evaporation. This last is the most
 difficult to determine; for supposing evapora-
 tion to be proportioned to the surfaces, it will
 be greater in a warm than in a cold climate.
 Besides, water mixed with salt and bitumen eva-

* See voyage de Levant de Tournefort, vol. ii. p. 123.

porates

porates more slowly than fresh water; a sea sub-
 ject to great agitation evaporates more quickly
 than a calm sea; and a difference in the depth
 has also some effect. In fine, so many particu-
 lars are included in the theory of evaporation,
 that it is not possible to make an exact estima-
 tion of its quantity.

The water of the Black Sea is less clear and
 less salt than that of the ocean. There are no
 islands in it; and its tempests are more violent
 and more dangerous than those of the ocean;
 because its waters, being extended in a basin
 which has but an inconsiderable outlet, move,
 when agitated in a kind of whirlpools, which
 beat upon all sides of a vessel with an insup-
 portable violence *.

After the Black Sea, the greatest lake in the
 world is the Caspian Sea, which extends from
 south to north about 300 leagues, and its mean
 breadth exceeds not 50. This lake receives the
 Volga, besides several other considerable rivers,
 as the Kur, the Faie, and the Gempo. But,
 what is singular, it receives not one river from
 the east coast; the country on that side is a sandy
 desert, which remained, till lately, altogether
 unknown. The Czar Peter I. sent engineers to
 make a chart of the Caspian Sea. It had been
 represented as round by former geographers;
 but it is very long and very narrow. Its east-
 ern coast, and the neighbouring country, were

* See voyages de Chardin, p. 142.

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entirely unknown; even Lake Aral, which is about 100 leagues east of the Caspian, was either not known to exist, or was considered as a part of this sea. Thus, before the discoveries of the Czar, there was in this region an unknown country of 300 leagues in length, and 100 or 150 in breadth. Lake Aral is nearly oblong, and about 90 or 100 leagues long, and 50 or 60 broad. It receives the Siderois and the Oxus, two large rivers; but, like the Caspian, it has no outlet for discharging its waters; and, as the Caspian receives no rivers from the east, Lake Aral, on the contrary, receives none from the west. Hence, it is presumable, that these two formerly constituted but one lake; and the rivers being gradually choaked up, the country between them would necessarily be covered with sand. There are some small islands in the Caspian; and its waters are much fresher than those of the ocean. Storms, in this sea, are exceedingly dangerous; and it affords not navigation to large vessels, on account of shoals, sand-banks, and rocks concealed under the surface. 'The largest vessels employed on the Caspian,' says Pietro della Valle*, 'along the coasts of the province of Mazanda in Persia, where stands the town of Ferhabad, although they be called *biprs*, are no better than our taranters: their sides are high; they draw little water, and are flat-bottomed. They are built of this

* Tom. iii. p. 235.

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'construction, not only because this sea is shallow near the coasts, but because it is full of shoals and sand-banks; so that no other vessels could be used with safety. I was surprised to see no fishing carried on at Ferhabad, except salmon at the mouth of the river, a bad kind of sturgeon, and other fresh water fishes of no value. I attributed this to their ignorance of navigation and of the art of fishing, till I was informed by the Cham of Esterabad, that this sea, at the distance of 20 or 30 miles from the shore, is so shallow, that nets could not be used with advantage; and that the same reason accounted for the construction of their vessels, which carry no cannon, because the Caspian is not infested with pirates.'

Struys, Avril, and others, affirm, that, in the neighbourhood of Kilan, there are two gulfs, which swallow up the waters of the Caspian, and carry them, by subterraneous passages, into the Persian Gulf. De Fer, and other geographers, have laid down these gulfs in their maps, though we are assured by the Czar's envoys, that they have no existence*. The fact, with regard to the willow leaves found on the Persian Gulf, and which are alledged by the same authors to be transported from the Caspian Sea, because no willows grow near the Persian Gulf, appears to be equally improbable, as the subterraneous passages, which Gemelli Careri, as well

* See Mem. de l'Acad. des Sciences, année 1721.

as the Russians, maintain to be altogether imaginary. Besides, the Caspian is about a third less than the Black Sea, which last also receives more water by rivers; evaporation, therefore, is alone sufficient to carry off all its adventitious waters, without the assistance of imaginary gulfs, or subterraneous passages.

There are lakes, or seas, which neither receive nor discharge rivers; there are others which both receive and discharge, and others which only receive. The Caspian, Lake Aral, and the Dead Sea, are of the last kind: In Asia Minor, there is a small lake of the same species: There is another still larger in Persia, upon which the city of Marago is situated: It is of an oval figure, and about 10 or 12 leagues long, and 6 or 7 broad: It receives the Tauris, which is not a very considerable river. If to these we add a small lake of the same nature in Greece, 12 or 15 leagues from Lepanto, we have an enumeration of all the known lakes in Asia which belong to this species. In Europe, there is not a single one of any consideration. There are several small lakes of this kind in Africa, as those which receive the rivers Ghir, Zez, Touguedot, and Tafilet. These four lakes lie at no great distance from one another, and are situated on the frontiers of Barbary, near the desert of Zaara. There is another in the province of Kovar, which receives the river that runs through the country of Berdoa. In North

North America, which abounds with lakes, there are none of this kind, except two small collections of water formed by brooks, the one near Guatimapo, and the other some leagues from Realnuevo, both in Mexico. But in Peru there are two contiguous lakes, one of which, Lake Taticaca, is very large, and receives a river which rises near Cusco; but it gives rise to no river. There is a small lake in Tucuman, which receives the river Salta; another, in the same country, of greater extent, receives the Santiago; and three or four between Tucuman and Chili.

Those lakes, which neither receive nor give rise to any river, are more numerous than the kind just mentioned. They are a species of swamps, which collect the rain water; or, they may originate from subterraneous waters that issue in the form of springs in low grounds, from which there is no fall to carry them off. Those rivers that overflow may also leave stagnating waters upon the land, which remain a considerable time, and are occasionally recruited by subsequent inundations. Salt lakes may sometimes be produced by inundations from the sea, as that at Harlem, and several others, in Holland, to which no other origin can be ascribed. The sea, likewise, by abandoning certain lands, may have left lakes in the low grounds of particular countries, and which continue to be maintained by the rains. Of this kind, there are

are small lakes in Europe, as in Ireland, in Jutland, in Italy, in the country of the Grisons, in Poland, in Muscovy, in Finland, and in Greece: But all these are of little consideration. In Asia, near the Euphrates, in the desert of Irac, there is one above 15 leagues long; another in Persia, nearly of the same extent, upon which are situated the towns of Kelat, Tetuan, Vastan, and Van; a small one in Chorazan, near Ferrior; another in Independent Tartary, called *Lake Levi*; two in Muscovite Tartary; one in Cochinchina; and, in fine, a pretty large one not far from Nankin. This last, however, communicates with the neighbouring sea by a canal of considerable extent. In Africa, there is a small lake of this species in the kingdom of Morocco; another near Alexandria, which appears to have been left by the sea; another, 8 or 10 leagues long, formed by the rain-water, in the desert of Azarad, about the 30th degree of latitude; another, still larger, upon which is situated the town of Goga, under the 27th degree; another, but much smaller, near the town of Kanum, under the 30th degree; one near the mouth of the river Gambia; several others in Congo, about the 2d or 3d degree of south latitude; two others in the country of the Caffres; one of them, called *Lake Rufumbo*, is not very extensive; and the other, which lies in the province of Arbuta, is perhaps the largest of this kind, being about 25 leagues long, and 7 or 8 broad:

8 broad: There is likewise one of these lakes near the east coast of Madagascar, about the 29th degree of south latitude.

In America, there is one of these lakes situated in the middle of the peninsula of Florida, which has an island called *Serrope* in its centre. The lake near the town of Mexico, which is round, and about 10 leagues in diameter, belongs likewise to this species. There is another still more extensive in New Spain, about 25 leagues from the eastern coast of the bay of Campeachy; and another, of smaller dimensions, in the same country, near the coast of the South Sea. Some travellers have affirmed, that, in the interior parts of Guiana, there is a very large lake of this species, which they call *Golden Lake*, or *Lake Parima*; and they have given marvellous accounts of the riches of the neighbouring country, and of the great quantities of gold dust found in this lake, which they alledge to be more than 400 leagues in length, and above 125 in breadth: No river, it is said, either enters into or issues from it. Though this lake be laid down in several maps, its existence is still problematical.

But the most common and the most extensive lakes are those which both receive and give rise to rivers: As they are exceedingly numerous, I shall only mention the largest, or the most remarkable of them. Beginning with Europe, we have, in Switzerland, the Lake of Geneva,
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that of Constance, &c. In Hungary, Lake Balaton, and another, of equal extent in Livonia, which separates this province from Russia; Lake Lapwert in Finland, which is very long, and divides into several branches, and Lake Oula, which is of a circular figure: In Muscovy, Lake Ladoga, which is more than 25 leagues long, and above 12 broad; Lake Onega, which is equally long, but not so broad; Lake Ilmen; Lake Belozero, which is one of the sources of the Wolga; Lake Iwan-Osero, which is one of the sources of the Don; and two other lakes, from which the river Vitzogda derives its origin: In Lapland, the lake from which issues the river Kimi; another, much larger, and situated near the coast of Wardhus; and several others of less note, which give rise to the rivers Lula, Pitha, and Uma: In Norway, two lakes nearly of the same dimensions with those of Lapland: In Sweden, Lake Vener, which is as large as Lake Meller, upon which Stockholm is situated; and two less considerable, one near Elvedal, and the other near Lincopin.

In Siberia and in Muscovite and Independent Tartary, there are a great number of these lakes, of which the principal are, the great lake Baraba, which is more than 100 leagues long, and the waters of which fall into the Irtis; the great lake Estraguel, the source of the Irtis; several lesser ones, the sources of the Jenisca; the great lake Kita, the source of the Oby; another great

lake, the source of the Angara; Lake Baical, which is more than 70 leagues long, and is formed by the river Angara; and Lake Pehu, the source of the Urack, &c. In China and Chinese Tartary, we have Lake Dalai, the source of the great river Argus, which falls into the Amour; the lake of the Three Mountains, the source of the river Helum, which falls likewise into the Amour; the lakes of Cinhal, Cokmor, and Sorama, the sources of the river Hoamho; two large lakes in the neighbourhood of Nankin, &c. In Tonquin is the Guadag, a lake of considerable magnitude. In India, we have Lake Chiamat, which is the source of the river Laquia, and lies near the sources of the Ava, the Longenu, &c. This lake is more than 50 leagues long, and about 40 broad. The source of the Ganges is another lake; and one near Cashmire gives rise to the Indus, &c.

In Africa, there are Lake Cayar, and two or three others, near the mouth of the Senegal; Lake Guarda, and Lake Sigisnus, which, together, make a triangular lake of 100 leagues long, and 75 broad, and contain a considerable island. It is in this lake that the Niger loses its name, and, at its exit, assumes that of *Senegal*. In ascending towards the course of this river, we meet with another pretty large lake called *Bournou*, where the Niger again changes its name; for the river that falls into this lake is called *Gombaru*. At the sources of the Nile in Ethiopia,

pia, is the great lake Gambia, which is above 50 leagues long. On the coast of Guiney are also several lakes, which appear to have been originally formed by the sea; and there are few others in Africa of any note.

North America is the country of lakes. The most extensive of them are, Lake Superior, which is about 125 leagues long, and 50 broad; Lake Huron, which is near 100 leagues in length, and about 40 in breadth; Lake Illinois, which comprehending the bay of Puants, is nearly as extensive as Lake Huron; Lake Erie and Lake Ontario, which, together, exceed 80 leagues in length, by 20 or 25 in breadth; Lake Mistassin, to the north of Quebec, is about 50 leagues long; Lake Champlain, to the south of Quebec, is nearly of equal length; Lake Alemipigon, and Lake Christinaux, both to the north of Lake Superior, are likewise considerable; the Lake of Assiniboils contains several islands, and is more than 75 leagues long: Besides the Mexican Gulf, there are two considerable lakes in that country; that called Nicaragua, in the province of the same name, is about 70 leagues in length.

Lastly, in South America, there is a small lake, the source of the Maragnon. A more extensive one gives rise to the river Paraguay: There are, besides Lake Titicares, the waters of which fall into the river Plata, two lesser ones, which discharge their waters into the same river;

ver; and some inconsiderable ones in the interior parts of Chili.

All lakes that give rise to rivers, and all those which occur in the course of rivers, or which border upon and discharge their waters into rivers, are not salt. Almost all those, on the contrary, which receive rivers, but give rise to none, are salt. This circumstance seems to favour the opinion, that the saltness of the sea is occasioned by salts brought down from the land by the rivers; for we find salt does not evaporate; and, of course, all that is transported by the rivers remains in the sea: Although the water of rivers appears to be fresh, it is well known, that it contains a small quantity of salt, which, in the course of ages, might accumulate to such a degree as would be sufficient to produce the present saltness of the sea, which must be continually augmenting. It is in this manner, I presume, that the Caspian, Lake Aral, and the Black Sea, have become salt. With regard to those seas, which, like marshes, or swamps, neither receive nor discharge rivers, they are either salt or fresh according to their origin. Those in the neighbourhood of the sea are commonly salt; and those at a distance from it are fresh; because the former have originated from inundations of the sea, and the latter from fresh fountains.

The waters of the Dead Sea contain a great deal of the bitumen of Judea, which is nothing but

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asphaltes;

asphaltes; and, accordingly, this sea is often termed the *Asphaltic Lake*. The neighbouring land is impregnated with this bitumen: And many have imagined, that, like the Lake Aver-nus, no fishes could live in it, and that birds were suffocated in attempting to fly over it. But such dismal effects are produced by neither of these lakes; for both of them contain fishes, the birds fly over them in safety, and men bathe in them with impunity.

It is said, that, in Bohemia, there is a lake, which has holes in it so deep, that they cannot be sounded, and that, from these holes, there issue violent winds which sweep over all Bohe-mia, and, in winter, raise into the air masses of ice of more than 100 pounds weight*. We are likewise told of a petrifying lake in Iceland; and Lake Neagh in Ireland possesses the same quality. But these petrifications are, doubtless, nothing but incrustations similar to those produced by the waters at Arcueil.

* See *Act. Leipf.* anno 1682, p. 246.

P R O O F S

OF THE

THEORY OF THE EARTH.

ARTICLE XII.

Of the Tides.

WATER, like other fluids, naturally descends from the higher to the lower grounds, if not prevented by some interposed obstacle; and, after it has occupied the lowest situation, it remains smooth and tranquil, unless disturbed by some foreign cause. All the waters of the ocean are collected in the lowest places upon the surface of the earth; and hence the motions of the sea must proceed from external causes. The chief motion is that of the tides, which rise and fall alternately, and from which results a general and perpetual motion, in all seas, from east to west. These two motions have an invariable relation to the motions