LXXV. *An Account of a manuſcript treatiſe, preſented to the* Royal Society, *intituled,* Traité du corail, contenant les nouvelles decouvertes, qu'on a fait ſur le corail, les pores, madrepores, ſcharras, litophitons, eponges, et autres corps et productions, que la mer fournit, pour ſervir a l'hiſtoire naturelle de la mer; *that is to ſay, A Treatiſe upon Coral, and ſeveral other Productions furniſh'd by the Sea, in order to illuſtrate the natural Hiſtory thereof, by the Sieur* de Peyſſonnel, *M. D. Correſpondent of the Royal Acad. of Sciences of* Paris, *of that of* Montpelier, *and of that of* Belles Lettres *at* Marſeilles; *Phyſician-Botaniſt, appointed by His Moſt Chriſtian Majeſty in the Iſland of* Guadalupe, *and heretofore ſent by the King to the Coaſts of* Barbary *for Diſcoveries in Natural Hiſtory. Extracted and tranſlated from the* French *by Mr.* William Watſon, *F. R. S.*

Read May 7, 1752. THIS curious treatiſe before us, containing upwards of 400 quarto pages in manuſcript, was tranſmitted to the Royal Society from Guadalupe. It is the reſult of the obſervations of above thirty years; and was ſent hither, as M. de Peyſſonnel informs the Society by a letter dated

dated at Guadalupe May 1, 1751, to be inſerted, if it ſhould be found worthy, in the *Philoſophical Tranſactions.*

He does this, as he perceives, that in France ſome lovers of natural hiſtory do attribute and even appropriate to themſelves his labours and his diſcoveries, of which they have had the communication; and that himſelf, retired to the Weſt Indies, and not having the means of giving to his work the perfection he deſired, for want of books, and yet more for want of judicious perſons, with whom he might not only conſult, but who might alſo enable him to give a more full explanation to ſuch paſſages of his work, as might be thought obſcure, and even correct the faults thereof; for which reaſon he takes the liberty to requeſt this good office of the Royal Society.

This treatiſe is divided into two parts; the firſt of which relates to coral only, and is ſubdivided into ten chapters; to which is ſubjoined a catalogue of the remedies and compoſitions, as well chemical as galenical, in which coral is an ingredient. The ſecond part is ſubdivided into eight diſſertations, each of which has for its object ſome production of the ſea; and the whole tends to evince, that as well coral, as the other marine bodies herein ſpecified, and hereafter to be conſider'd, are produced by animals, *viz.* different kinds of *urtica marina & purpura.* To theſe the author has added a complete index, referring to every thing taken notice of in the whole work.

This work is the reſult of a great number of very curious obſervations and inquiries, and has for its object a part of natural hiſtory not hitherto well known.

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For the difficulties, which there are, in getting from the bottom of the ſea its productions, and the few opportunities, which occur, of making the neceſſary obſervations upon ſea-plants, have been the cauſe, that this part of botany has been hitherto very imperfect; and that the antients have been ignorant of the organiſation and ſtructure of theſe plants, of which they were acquainted but with a very ſmall quantity, although the different ſpecies are exceedingly numerous.

M. Peyſſonnel, diſpoſed from his youth to the ſtudy of natural hiſtory, after having qualified himſelf for the practice of medicine, applied himſelf with great diligence to that ſcience, to which his inclinations ſo ſtrongly prompted him; and being a native of, and reſiding at Marſeilles, he had the opportunity of examining the curioſities of the ſea, which the fiſhermen, more eſpecially thoſe who ſearch for coral, furniſhed him with. Theſe conſiderations engaged him to endeavour to illuſtrate this obſcure part of natural hiſtory, which he was more particularly enabled to do, as he could examine the productions of the ſea the moment they were taken out of the water, or even in the ſea itſelf, when theſe bodies are in their natural ſtate: for moſt of thoſe naturaliſts, who have treated of them already, have not examined them, but when they have been disfigured by the air, and have changed their true ſtate by being dried. Beſides, that tranquillity of mind, which a juſt obſerver ſhould be always in poſſeſſion of, is frequently diſturbed in thoſe little ſlight boats uſed by the coral-fiſhers. Theſe, as well as ſeveral other difficulties, have been the cauſe, why we have ſo little knowlege

of the natural hiſtory of the ſea. Our author found the means of overcoming theſe obſtacles: the voyages which he made to the American iſlands, to St. Domingo, to Miſſiſſippi, to Egypt, and elſewhere, have accuſtomed him to the fatigues of the ſea; and the frequent opportunities of embarking himſelf with the coral-fiſhers and others were very favourable to his purpoſe, and contributed to the diſcoveries, which he made upon this ſubject, and which he verified and enlarged, when in Barbary by the king's orders. As coral, next to pearls and ambergriſe, was the moſt precious marine production, it was not to be wonder'd at, that our author firſt turned his thoughts to the inveſtigation of its hiſtory.

The firſt chapter therefore of the work before us contains the opinions of the antients concerning coral, and the obſervations made thereupon ſince their time; among which are the opinions of Peireſkius, Boyle, Piſo, Boccone, Venette, the Comte de Marſigli, and thoſe of M. de Peyſſonnel.

In the ſecond chapter is an examination, whether coral is a plant, or a congelation; in which are included two extracts, one from M. Tournefort's elements of botany, and the other from the memoirs of the Royal Academy of Sciences.

The third chapter exhibits new obſervations, from which are diſcovered the *urticæ marinæ & Purpuræ*, which form coral; wherein likewiſe are explained the formation and mechaniſm of this marine production.

In the fourth chapter we find new chemical obſervations upon the diſtillation of coral, which tend to prove, that coral is the production of inſects.

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In the fifth chapter are exhibited the definition, etymology, colours, and different ſizes of corals, and of the inſects inhabiting therein.

The ſixth chapter ſhews us the places, where they fiſh for coral, and the manner of fiſhing for it.

In the ſeventh chapter we have the manner of working upon, and of poliſhing coral, and the commerce therewith.

The eighth, ninth, and tenth chapters give us the chemical preparations of coral, its virtues and uſes in medicine, when variouſly prepared.

The ſubjects of the eight diſſertations of the ſecond part of this work are the ſeveral ſpecies of vermicular tubes found in the ſea, the madrepores, millepores, lithophytons, corallines, ſponges, the various ſhell-fiſh, which inhabit the ſea without changeing their place, and the formation and mechaniſm of theſe ſeveral ſubſtances.

This then is the general ſcope of our author; and though every part of his work deſerves to be conſidered, I muſt, upon account of the time uſually allowed to works of this nature, confine myſelf to ſuch parts only, as ſeem moſt to merit the attention of the Royal Society.

It had been long the received opinion, that coral was ſoft in the ſea, and was harden'd by the air upon taking it out of the water; and our learned Mr. Boyle was not willing to quit this opinion. But as experiments are the only way of aſſuring ourſelves of the truth, Boccone, for this purpoſe, went to ſea in one of the coral-fiſhers veſſels, and by plunging his arm into the water had an opportunity of examining the coral, as they were fiſhing it up, before it came

into the air. He invariably found it hard, except a its extremities; where, upon preſſing it between the nails of the fingers, it furniſhed a ſmall quantity of a milky fluid, reſembling in ſome degree the juice of ſpurge or ſow-thiſtle. Boccone obſerves farther, that he ſaw ſeveral furrows under the bark of the coral, which terminate at the extremities of the branches, about which one might clearly ſee ſeveral ſmall holes of the form of a ſtar, which he imagines are deſtined for the production of branches. Venette's account of coral in his treatiſe of ſtones is much the ſame as Boccone's.

The Count de Marſigli, in a letter to the Abbé Bignon, in the year 1706, takes notice, that, in order to give the moſt exact account of the production of coral, he wanted to be aſſured, whether the milky juice before-mentioned was found therein both in winter and ſummer, which was a matter of diſpute even among the coral-fiſhers. For this purpoſe he went in winter for a few days to ſea with the coral-fiſhers, and made ſeveral important diſcoveries into the nature of coral. He ſent the Abbé Bignon an account of ſome branches of coral, which he found cover'd with flowers, and which was a thing unknown even to the coral-fiſhers themſelves. Theſe flowers were about a line and a half in length, ſupported by a white calyx, from which proceeded eight rays of the ſame colour. Theſe were of the ſame length, and of the ſame diſtance one from the other, and formed a ſtar-like appearance. Theſe bodies, which the Count de Marſigli imagined were flowers, M. Peyſſonnel afterwards diſcover'd to be the inſects inhabiting the coral. As to the fact, whether the coral furniſhed a milky juice

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in winter as well as in ſummer, Count de Marſigli obſerved, that he did in December find the milky juice between the bark of coral and its ſubſtance, in the ſame manner as he did in the month of June preceding.

M. de Peyſſonnel was unwilling, that the idea, which the ingenious diſcovery of the Count de Marſigli had given, in relation to the flowers of coral, ſhould be loſt; and therefore, being at Marſeilles in the year 1723, he went to ſea with the coral-fiſhers. Being well appriſed of what Marſigli had obſerved, and the manner of his making theſe obſervations, as ſoon as the net, with which they bring up the coral, was near the level of the water, he plunged a glaſs veſſel therein, into which he convey'd ſome branches of coral. Some hours after, he obſerved, that there appear'd a number of white points upon every ſide of this bark. Theſe points anſwer'd to the holes, which pierced the bark, and formed a circumſcribed figure with yellow and white rays, the center of which appear'd hollow, but afterwards expanded itſelf, and exhibited ſeveral rays reſembling the flower of the olive-tree; and theſe are the flowers of coral deſcribed by Marſigli.

Having taken this coral out of the water, the flowers enter'd into the bark, and diſappear'd; but being again put into the water, ſome hours after they were perceptible again. He thought them not ſo large as the Count de Marſigli mentions, ſcarce exceeding in diameter a large pin's head. They were ſoft, and their petals diſappear'd, when they were touched in the water, forming irregular figures. Having put ſome of theſe flowers upon white paper,

they loſt their tranſparency, and became red as they dried.

Our author obſerved, that theſe flowers grew from the branches in every direction, from broken ones, as well as from thoſe which were whole; but their number leſſen'd towards the root; and after many obſervations he determines, that what Marſigli took for flowers were truly inſects.

Coral is equally red in the ſea as out of it; and this redneſs is more ſhining, when juſt taken out of the water, than even when it is poliſh'd. The bark of coral, by being dried, becomes ſomewhat pale. The extremities of its branches are ſoft, to the length of five or ſix lines; they are fill'd with a whitiſh juice tending to yellow. The coral-fiſhers ſaid, that in the month of May this juice did ſometimes appear upon the ſurface of the bark; but this, notwithſtanding great attention, our author could not obſerve.

The body of coral, although hard, ſeems to give way a little, when preſs'd between the fingers; and being broken at different diſtances, when juſt taken from the water, there always came therefrom a ſmall quantity of milky juice through certain tubes, which appeared to be deſtin'd towards the bark.

Having inquired of the fiſhers in what direction the coral grew in the ſea, they acquainted him, where the depth of the ſea permitted them to dive, that they had found it growing ſometimes perpendicularly downwards, ſometimes horizontally, and ſometimes upwards.

Having verified theſe obſervations during the eight days he ſtaid with the fiſhermen, he adds, that he had never found any pores perceptible in the ſubſtance of

of the coral; that there iſſued forth leſs milk from the large branches than from the ſmaller ones; and that the firſt were harder, and leſs compreſſible.

The bark of coral covers the whole plant from the root to the extremities of the ſmalleſt branches. It will peel off; but this is only when juſt taken out of the water. After it has been expoſed for a ſhort time to the air, you cannot detach it from the body of the coral, without rubbing it to powder. This bark appears pierced with little holes, and theſe anſwer to ſmall cavities upon the ſubſtance of the coral. When you take off a piece of this bark, you obſerve an infinite quantity of little tubes, which connect the bark to the plant, and a great number of little glands adhering to theſe tubes; but both one and the other do not diſtinctly appear, except when they are full of juice. It is from theſe tubes and glands that the milky juice of coral iſſues forth. Beſides theſe, you ſee in variety of places the bark puſh itſelf outwards, where the ſubſtance of the coral is hollow'd, and form'd into the little cells, taken notice of by Boccone and Marſigli. In theſe you ſee little yellowiſh bodies, of the length of half a line, which terminate at the holes in the bark; and it is from theſe that the flowers appear.

Our author has found branches of coral, which, having been broken, have fallen upon other branches, have faſten'd themſelves thereto, and have thus continued to grow. He has found, when a piece of ſtone, ſhells, or other hard bodies, have offer'd themſelves between the ramifications of coral, that it has expanded itſelf over them, and inveloped them in its ſubſtance. He has ſeen pieces of coral growing upon

upon detached pieces of rock, glaſs bottles, broken pots, and other ſubſtances, from which the plant could receive no nouriſhment. It has been ſaid by great authority, that coral grows from the rocks perpendicularly downwards; but our author has ſeen ſome growing to a round flint, which muſt neceſſarily have vegetated upwards, like moſt other plants.

M. de Peyſſonnel proceeds to examine, whether or no coral is a plant, according to the general opinion, or a petrification or congelation, according to ſome; and after have exhibiting the various arguments deliver'd in ſupport of theſe, he concludes, that coral, as well as all other ſtony ſea-plants, and even ſponges, are the work of different inſects, particular to each ſpecies of theſe marine bodies, which labour uniformly according to their nature, and as the Supreme Being has order'd and determin'd. The coral-inſect, which is here called a little *urtica*, *purpura*, or polype, and which M. Marſigli took for its flower, expands itſelf in water, and contracts itſelf in air, or when you touch it in water with your hand, or pour acid liquors to it. This is uſual to fiſhes or inſects of the vermicular kind.

When our author was upon the coaſts of Barbary in 1725, he had the pleaſure of ſeeing the coral-inſect move its claws or legs; and having placed a veſſel of ſea-water with coral therein near the fire, theſe little inſects expanded themſelves. He increaſed the fire, and made the water boil, and by theſe means kept them in their expanded ſtate out of the coral, as happens in boiling ſhell-animals, whether of land or ſea. Repeating his obſervations upon other branches, he clearly ſaw, that the little holes, perceptible upon the bark of the coral, were the openings through

through which theſe inſects went forth. Theſe holes correſpond with thoſe little cavities or cells, which are partly in the bark, and partly upon the ſubſtance of the coral; and theſe cavities are the niches, which the inſects inhabit. In the tubes, which he had perceived, are contained the organs of the animal; the glandules are the extremities of his feet, and the whole contains the liquor or milk of coral, which is the blood and juices of the animal. When he preſs'd this little elevation with his nails, the inteſtines and whole body of the inſect came out mix'd together, and reſembled the thick juice furniſh'd by the ſebaceous glands of the ſkin. He ſaw, that the animal, when it wanted to come forth from its niche, forced the ſphincter at its entrance, and gave it an appearance like a ſtar with white, yellow, or red rays. When the inſect comes out of its hole without expanding itſelf, the feet and body of it form the white appearance, obſerved by Marſigli; but being come forth, and expanded, it forms what that gentleman and our author took for the petals of the flowers of coral, the calyx of this ſuppoſed flower being the body of the animal protruded from its cell. The milk before-mention'd is the blood and natural juice of the inſect, and is more or leſs abundant in proportion to its health and vigour. When theſe inſects are dead, they corrupt, and communicate to the water the ſmell of putrid fiſh.

The ſubſtance of coral, by a chemical analyſis, ſcarce furniſhes either oil, ſalt, or phlegm: live coral with its bark furniſhes about a fortieth part of its weight in theſe; but the bark of coral alone, in which are contain'd theſe animals, affords a ſixth part.

part. Theſe principles reſemble thoſe drawn from human ſcull, hartſhorn, and other parts of animals.

After the accounts here laid down, we are able to aſſign the reaſons of all the particular facts we obſerve in coral. We ſee, why a branch thereof, broken off and detach'd from its ſtem, may flouriſh. It is becauſe the coral-inſects, which are contain'd in its cells, not having been injured, continue their operations; and drawing no nouriſhment from the ſtem of the coral, are able to increaſe, detached and ſeparate. How they live and are nouriſhed, is propoſed to be explain'd in treating of the urtica of the Madrepora, in which theſe animals are vaſtly larger, and appear very diſtinctly.

In each hole or ſtar of the Madrepora, on which our author lays the evident proof of his new ſyſtem, the urtica, placed in the centre of each pore, cauſes it to increaſe in every direction, by lifting itſelf further and further from the centre of the ſtone. And in coral, and in the lithophyton, the urtica, being niched in their cruſts or barks, depoſits a juice or liquor, which runs along the furrows perceiv'd upon the proper ſubſtance or body of coral, and, ſtopping by little and little, becomes fixed and hard, and is changed into ſtone; and this liquor, being ſtopped by the bark, cauſes the coral to increaſe proportionably, and in every direction. In forming coral, and other marine productions of this claſs, the animals labour like thoſe of the teſtaceous kind, each according to his ſpecies, and their productions vary according to their ſeveral forms, magnitudes, and colours.

If, after what has been here laid down, ſome will ſtill conſider theſe marine productions as plants, they

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are truly zoophytes, formed by the labour of the animals, which inhabit them, and to which they are the ſtay and ſupport.

By what is exhibited in this work, the author conceives, that he has explain'd the nature of theſe ſeveral marine productions, which have hitherto been ſo enigmatical. It is true indeed, that no reaſons can be aſſign'd, why the oeconomy of theſe animals is directed in ſuch or ſuch particular forms. We can no more account for the admirable ſtructure and colour of ſeveral ſpecies of ſhell-fiſh: we muſt in this, as in moſt of the other operations of nature, cry out, *O altitudo divitiarum!*

Swammerdam ſeems to have proceeded very far in theſe diſcoveries, as you may ſee by his letter to Bocconi*. He goes farther, and ſays, that having with a microſcope examin'd a piece of coral, he found, that each particle thereof was compoſed of ten or twelve angular and chryſtalline ſpherules; and having ſaw'd acroſs a piece of coral, and given it the higheſt poliſh, he found with the microſcope, and even without it, that coral from its centre is diſpoſed in *ſtrata*, which he conjectures are form'd by the application of the above-mention'd ſpherules.

M. de Reaumur, having been made acquainted with what M. de Peyſſonnel had obſerv'd, ſent him a letter thereupon in the year 1726; wherein he takes notice, that no one had hitherto conſider'd coral as the work of inſects. But it ſeem'd to him difficult to eſtabliſh this doctrine in the generality of

* Lettre xix. fol. 164.

marine productions, as was our author's opinion. That however you conſider'd coral and lithophytons, it did not appear poſſible, that they were the conſtructions of the inſects inhabiting therein: That the only ſyſtem to be adopted upon theſe matters, was, what he mention'd to our author heretofore; and that is, that the bark of theſe bodies only is a plant properly ſpeaking; and that this depoſits a ſtony matter, which forms the ſtalk neceſſary to ſuſtain it. That then, in his opinion, all the difficulties vaniſh with regard to the organization of coral.

In the year 1726, M. de Peyſſonnel was appointed phyſician-botaniſt to the iſland of Guadeloupe, where he has continued his obſervations, which have more and more convinc'd him of the truth of his ſyſtem. He takes notice, that the leproſy, a diſorder elſewhere almoſt unknown, is frequent in this iſland: Our author muſt mean here the *elephantiaſis*, or leproſy of the Greeks; as that of the Arabians is too frequent every-where.

M. de Peyſſonnel acquaints us, he has ſince found, that M. Bernard de Juſſieu and M. de Reaumur were themſelves convinc'd of the truth of his obſervations in the expeditions they have made, one to the ſea-coaſts near Rochelle, and the other in Normandy.

In the courſe of this work our author mentions, that, beſides the animals to which coral owes its formation, there are three kinds, which he deſcribes at large, which pierce and corrode the coral while in the ſea, without preventing its increaſe.

Contrary to what has been generally received, and to what even the Count de Marſigli aſſerts, coral grows

grows among the rocks, and in the caverns of the ſea, open to every expoſure. It had always been ſaid, that it never grew in caverns open to the north; they muſt always be expoſed to the ſouth, at leaſt to the eaſt or weſt: but upon the coaſt of Barbary, which lies open to the north, coral is not leſs frequently found than elſewhere. It is generally obſerved to grow better and more readily in ſhallow than in deep water; and though they generally fiſh for it at the depth of ten or twelve fathom, they ſometimes get it, though but ſeldom, at an hundred and twenty.

M. de Peyſſonnel then gives us the manner of coral-fiſhing, and deſcribes two different machines made uſe of for this purpoſe: one, for fiſhing up the coral where the bottom is ſmooth, and it is the ſame, which is deſcribed by Gaſſendi in his life of Peyreſkius. The other, which is called in the Provencal language the *ſalabre*, is conſtructed ſo, as to be employ'd where the bottom of the ſea is rocky and unequal. He takes notice of the great ſkill and addreſs of the coral-fiſhers in the management of theſe machines, as well as their ſagacity, in finding, at conſiderable diſtances from the ſhore, the very places, where ſome time before they have been ſucceſsful. I am ſorry he has omitted to ſend us the figures and repreſentations of this fiſhing, which he tells us he has in his muſæum.

In the courſe of this work, our author takes notice, that all the productions of the ſea, of which he is now treating, have been conſider'd by naturaliſts ſometimes as ſtones, and ſometimes as plants. Their ſtony ſubſtance deceived ſome, their tree-like appearance

others; inſomuch that the bulk of writers, who have not ſeen theſe bodies except in their cabinets, have only conſider'd their figures. They have denominated pora that claſs of them, which ſeem'd pierc'd with holes. Of theſe they found ſome, the holes of which were large; and theſe they call'd madrepora.

There is another confuſion among the writers concerning theſe bodies: all thoſe, which had a tree-like form, whether their ſurfaces were ſmooth, without holes, or whether they were rough and unequal with them, they were all together ſtiled corals. Thoſe of any other form than that juſt now mentioned, were call'd madrepora, lithophyton, or alcyonium. It therefore appears neceſſary to eſtabliſh ſome eſſential characters to be able to diſtinguiſh theſe different bodies one from another; but before theſe marks of diſtinction are laid down, our author thinks proper to examine, what theſe bodies are, and how they are formed. He proceeds to remark, that divers productions are found in the ſea of a ſtony nature. Theſe bodies are always equal, and always the ſame in their different ſpecies: they have the ſame arrangement of parts, the ſame eſſential figure, and differ in nothing but in their outward form, like different vegetables. They are all pierced with holes and pores, which are of the ſame ſize and figure, and are of the ſame diſpoſition in each ſpecies; ſo that it appears evident, that they are all produced from the ſame matter. How they are produced, and their mechaniſm, has been hitherto unknown.

Our

Our author has given us, when treating of coral, ſeveral obſervations of other perſons relating thereto; but he finds none relating to the madrepora, and the other ſea productions. But the knowledge, which he had acquired into the nature of coral, conducted him to the diſcovery, which he made, of the animals, that form the madrepora.

As this ſyſtem is new, he thinks it neceſſary to give his obſervations, as they enabled him to form it. He defines the madrepora's to be all thoſe marine bodies, which are of a ſtony ſubſtance, without either bark or cruſt, and which have but one apparent opening at each extremity, furniſh'd with rays, which proceed from the centre to the circumference. He then takes notice of the means, by which he found the madrepora to be the habitation of animals. So early as the year 1719, when his curioſity carried him to the coral-fiſhing on the coaſt of Provence; and though intent only upon coral, and neglecting to examine any other marine production, he nevertheleſs obſerv'd, that the extremities of the madrepora were ſoft, and cover'd with a mucoſity, which had a fiſhy ſmell. From thence he ſuſpected, that therein was contain'd ſome kind of animal, but his curioſity ſtopp'd here. Afterwards, being upon the coaſts of Barbary, the fiſhermen brought him in a barrel of ſea-water one of thoſe madrepora's, which are call'd in Provence, *fenouille de mer*, or ſea-fennel. It had been put into the barrel as ſoon as it was taken out of the ſea; and he obſerv'd, that the extremities of this madrepora were ſoft and tender, furniſh'd with a tranſparent mucoſity, like that of ſnails:

ſnails; theſe extremities were of a beautiful yellow colour, and were five or ſix lines in diameter.

He therein ſaw an animal, reſembling the cuttle-fiſh, polype, or ſea-nettle. The body of this fiſh fill'd the centre; its head was placed in the middle thereof, and was ſurrounded by ſeveral feet or claws: theſe feet fill'd the intervals of the partitions obſerv'd in the madrepora, and were at pleaſure brought to its head, and were furniſh'd with yellow *papillæ*. Its head or centre was lifted up occaſionally above the ſurface, and often contracted and dilated itſelf like the pupil of the eye. He had the pleaſure of ſeeing it move diſtinctly all its claws, as well as its head or centre.

We can eaſily conceive all theſe motions, from what we all of us have lately ſeen in the freſh-water polype, diſcover'd by our worthy member Mr. Trembley: and it is to be obſerv'd, that the great ſea polype (which is eaten in Lent in the Mediterranean, and which is found upon our own coaſts, and uſually call'd a *prule*) the animal of the madrepora, that of coral, and the freſh-water polype, ſcarce differ but in magnitude; ſo that from having ſeen one, an idea of the reſt may eaſily be formed. And I mention this with the more freedom, as I myſelf, upon a viſit with Mr. Trembley in Suſſex at the late excellent Duke of Richmond's, whoſe loſs we yet lament, ſaw the ſame order and oeconomy obſerved in the coralline *, as is mention'd by M. de Peyſſonnel of the

* In that ſpecies of it intituled by Mr. Ray, *Corallina minus ramoſa alterna vice denticulata*. Vide Raii Synopſ. Edit. 3. p. 35.

the coral and madrepora. This phænomenon Mr. Trembley had diſcover'd ſome time before; and having put ſome freſh collected coralline into a phial of ſea-water, brought it to Goodwood; where, after it had been ſuffer'd to remain at reſt a few hours, by the aſſiſtance of a microſcope a great number of very ſmall white polypes, exactly in form reſembling the freſh water polype, but infinitely leſs, were ſeen to protrude themſelves from the inequalities of the coralline, each of which ſerv'd as an habitation for a polype. When the water was ſtill, theſe animals came forth, and mov'd their claws in ſearch of their prey in various directions; but, upon the leaſt motion of the glaſs, they inſtantly diſappear'd; as was the caſe of the coral-inſect, deſcrib'd by our author.

But to return. The fleſh of the animal of the madrepora is ſo ſoft, that it divides upon the gentleſt touch. This ſoft texture prevented M. de Peyſſonnel from detaching any one; and he obſerves, that there are in thoſe ſeas ſeveral large ſpecies of urtica, which become pappy upon the leaſt touch. He mentions one ſort of above a foot in diameter, whoſe body is as large as a man's head, and which are of a poiſonous nature.

After the madrepora had been preſerved three days, the animals therein cover'd its whole ſurface with a tranſparent jelly, which melted away, and fell to the bottom of the water as the animal died; and both the water and madrepora then had a putrid fiſhy ſmell. After having deſtroy'd and conſum'd all the animals, the extremities of the madrepora became white.

Imperatus

Imperatus ſeems to have border'd upon this diſcovery, when he ſays, " that the extremities of the " madrepora are ſoft, of an obſcure purpliſh colour, " containing a membranous ſubſtance; from whence " one might ſuſpect, that it partakes of a ſenſitive " and animal life."

Our author made the experiment here laid down upon every ſpecies of madrepora, which he found, during the three months he continu'd upon the coaſts of Barbary. He obſerv'd always the ſame appearance, allowing ſome little difference for the colour and ſize of the animals, the texture of their bodies, and that of the bodies themſelves, upon which they were produced.

From what I have here extracted concerning the coral and madrepora, an idea may be formed of the millepora, lithophyton, corallines, and ſponges; each of which is, according to our author, the habitation of numerous animals, and form'd by them. He has given us from his own obſervations particular accounts of each of theſe productions, and divided them into *genera* and *ſpecies* with great accuracy; and though in common they are the habitations of animals, each ſpecies varying in form and bulk, and compoſing its cell in various forms and manners, and of different conſiſtences, conſtitutes their eſſential character. As oyſters, ſcallops, muſcles, cockles, ſnails, *&c.* have a power given them by the Author of nature of forming and enlarging their ſeparate dwellings; to theſe bodies, the ſubjects of this treatiſe, the ſame power is given, but in large families.

In the madrepora, its animal occupies the extremity; in the millepora, the ſubſtance; in corallines and

and ſponges, the void places; in coral and lithophytons, the cortical parts.

Each of theſe animals, according to their kind, furniſh ſubſtances, differing, as much in conſiſtence as in form. That of coral is extremely hard, and compact; the madrepora and millepora are of a ſtony, but more looſe texture; the coralline is ſtill more ſoft; the lithophyton of a ſubſtance nearer horn than ſtone; and the ſponge is ſoft and elaſtic.

We obſerve a great variety in the operations of nature: the crab, the cuttle-fiſh, and the ſea ſpider, are endow'd with a teſtaceous covering; the eſculent ſea polype, and others of that claſs, have no ſuch defence. So moſt of the animals, hitherto taken notice of in this treatiſe, have a ſecure retreat; but there is a production, denominated by Imperatus *Lorica marina*, which has no ſuch convenience. It is, if I may be allow'd the expreſſion, a ſoft madrepora. It grows at the bottom of the ſea, and is a ſeries of circular tubes, of about half an inch long, and of two or three lines in diameter. Each of theſe, at the end moſt remote from the centre, is furniſh'd with a ſphincter, from which are occaſionally protruded the legs or claws of the animal, like thoſe before-mention'd. The tubes themſelves are likewiſe at pleaſure lengthen'd and ſhorten'd. They are faſten'd to the rocks by a common broad ſurface, after the manner of coral, and ſuch-like marine productions, and are of a coriaceous ſubſtance. Hither likewiſe may be referr'd the ſoft lithophyton, uſually call'd the ſea mulberry, and deſcribed by our author,

which, upon obſervation, exhibits nearly the ſame phænomena with the preceding.

It remains now, that I lay before you ſome account of our author's opinion concerning the propagation of theſe animals. He ſuppoſes, that they ſpawn, as oyſters do; and that their ſpawn is inveloped in a viſcous ſubſtance, like that of teſtaceous and other fiſh; and that by this viſcoſity it is faſten'd indifferently to whatever ſolid body falls in its way, whether it be a rock, glaſs, broken pots, flint-ſtones, and ſuch-like. This viſcous matter, coming to ſtagnate, is changed, according to its nature, into a ſolid, and forms a *lamina* or *ſtratum*, ſuch as is obſerved at the baſe of theſe productions, and ſerves as it were for their firſt principle. The egg, inveloped in this viſcous ſubſtance, is hatch'd in its proper time, and furniſhes the animal, which reſembles the ſea polype, and other ſoft fiſh. Theſe animals have all the neceſſary organs, and among others a particular gut, which, in the cuttle-fiſh, is fill'd with a black liquor, the uſe of which, according to the vulgar opinion, is that of being pour'd out at pleaſure, to prevent the animal being taken when purſued: but this liquor, according to our author, ſerves the animals, the ſubjects of this treatiſe, with a matter capable of growing hard; and furniſhes the increaſe of the body or ſhell of the animal, which, like other ſhells, remains always of the ſame form, and is of a ſize proportionable to the animal. In the madrepora it lifts itſelf up under the animal, which always lies upon it; but in the millepora it increaſes from the centre as the animal grows larger; and thus theſe marine productions grow in juſt proportions.

Theſe

Theſe animals are nouriſh'd without changing their place, like American oyſters, which faſten themſelves to the roots of the *mangles*; or like what has been heretofore call'd *concha anatifera*, which faſtens itſelf to old planks. Nature has furniſh'd theſe polypes with claws, which they occaſionally protrude from their cells, and ſeize their prey, as it paſſes by them; and thus they are nouriſhed, and increaſe, according to their particular mechaniſm and conſtruction.

There are ſome ſpecies of the polype of the madrepora, which are produced ſingly, others in cluſters. The firſt of theſe kinds may ariſe from the parent animal furniſhing but one egg at a time: other ſpecies depoſit a number of theſe eggs at the ſame time, which coming to life all together are joined in ſuch a manner, that they ſeem to conſtitute one and the ſame body.

The millepora's grow one upon another; their little animals produce their ſpawn, which attaching itſelf either to the extremity of the body already formed, or underneath it, gives a different form to this production. Hence the various ſhapes of the millepora, which is compoſed of an infinite number of the cells of theſe little inſects, which all together exhibit different figures, notwithſtanding that every particular cellule has its eſſential form, and the ſame dimenſions, according to its own ſpecies.

I have thus endeavour'd, in as conciſe a manner as I was able, to communicate ſome account of the labours of the very ingenious author of the work before us. The time allow'd by the Society for theſe extracts does not permit me to give any idea of his

arrangement of the great variety of bodies, the ſubjects of this treatiſe, which is interſperſed everywhere with very curious remarks. You ſee, that M. de Peyſſonnel, if his ſyſtem is admitted, has made a great alteration in that part of natural hiſtory, of which we are now treating. Naturaliſts had been divided, whether coral, and the harder productions of the ſea, ſhould be conſider'd as plants or ſtones. Thoſe, who look'd upon them as ſtones, among whom was Dr. Woodward, imagin'd themſelves juſtified in this opinion, from their exceſſive hardneſs, and from their ſpecific gravity; and they were herein confirm'd, by obſerving, that if theſe bodies were calcined, they were converted into lime. Guiſonæus, in his letter to Boccone, ſays poſitively, that coral is not a plant, but a real mineral, compoſed of much ſalt, and a ſmall quantity of earth: he ſuppoſes its form given it by a precipitation, ſomething like that of the *arbor Dianæ* of the chemiſts.

Dioſcorides, Pliny, Cæſalpinus, Boccone, Ray, Tournefort, and Geoffroy, thought coral to be a plant, from its root's being fixed to rocks or ſtones, as thoſe of trees are to the earth; and from its ſending forth a trunk, which ramified into branches. This opinion was ſeemingly ſtrengthen'd by Boccone's obſervation of the milky juice at the tops and in the cells of coral; and moſt of all by the Count de Marſigli's diſcovering, in the year 1706, what he conjectured were the flowers of coral. Both theſe opinions, countenanced by long time, and great authority, M. de Peyſſonnel has endeavoured to overturn; and to ſhew, that theſe productions were neither ſtones, nor vegetables, but animals; and that, like

like oyſters, and other ſhell-fiſh, nature had impower'd them to form themſelves a ſtony dwelling for their protection and ſupport, each according to its kind.

Some account of M. de Peyſſonnel's diſcoveries was tranſmitted by him to the Royal Academy of Sciences at Paris in the year 1727; but they were not much attended to, till our ingenious brother Mr. Trembley's diſcovery of the freſh-water polype. This added much to their weight, and occaſion'd M. Bernard de Juſſieu, of this Society, and of the Royal Academy of Sciences at Paris, to viſit, in the year 1741, the ſea-coaſts of Normandy, in order to ſatisfy himſelf of the nature of theſe marine productions; and his obſervations confirmed thoſe of M. de Peyſſonnel. The ſentiments of that great naturaliſt M. de Reaumur upon this ſubject may be ſeen at large in the preface to the ſixth volume of his hiſtory of inſects.

I cannot conclude this account, without obſerving, that, in my opinion, the Royal Society is greatly obliged to M. de Peyſſonnel, for his tranſmitting this manuſcript, which I conſider as a very valuable literary preſent.