NANCY MORRELL

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Presented by Miss Nancy Morell of New York to the Theological Seminary at Princeton — with Love from young Desp —

Octr 9. 1814

Princeton
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March 3rd
1837.

BEAUTIES of STURM.

She hazards her own life, to save that of her chickens.

Lesson 51.

London, Published by Jas. Scatchard, & the rest of the proprietors. June 20th 1798.

BEAUTIES
OF
STURM,
IN
LESSONS
ON THE
WORKS OF GOD,
AND OF HIS
PROVIDENCE.

Rendered familiar to the Capacities of Youth.

By ELIZA ANDREWS,

Author of ALLEGORICAL MINIATURES, the BROTHERS, &c.

LONDON:

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1798.

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THE

THE BEAUTIES OF STURM'S REFLECTIONS.

LESSON I. FIRST WEEK.

MEDITATIONS ON NEW-YEAR'S DAY.

I REPRESENT to myſelf this firſt day of the year as if it were the firſt day of my life; and I preſume to hope, from the bleſſings received, that this year will equal thoſe which have been granted me from my birth till now. What may I not hope from my heavenly Father, who, from the firſt moment of my exiſtence, yes, even before I was born, provided for me with ſo much tenderneſs and goodneſs? In my parents he gave me friends, who, from my very birth, ſupported and brought me up, and whoſe diſintereſted affection protected me in that weak and helpleſs ſtate. Without ſuch care, how could I have been preſerved to enjoy the many bleſſings I now poſſeſs.

I enter with the preſent day into a new period of life, not ſo much unprovided for, nor ſo helpleſs, as when I firſt came into the world, but with equal occaſion for aſſiſtance in many reſpects. I require friends to ſhed ſweets upon my life, to ſupport my ſpirits, when oppreſſed with grief, and to warn me of dangers that I might otherwiſe fall into. And ſurely my heavenly Father will grant me this beſt of bleſſings. Whatever may happen to me during the courſe of the year, he has undoubtedly choſen for me a friend, who will be my adviſer in difficulties, and my conſoler in misfortunes; who will ſhare the ſweets of proſperity with me, and in moments of weakneſs will aid and ſupport my reaſon. If in the courſe of the year I experience any misfortune, which I could not foreſee; if any unforeſeen happineſs fall to my lot; if I have any loſs to bear which I could not expect; all will work together for my good. Full of this conviction, I begin the new year. Let what will happen, I ſhall be more and more confirmed in the perſuaſion, that God will be my preſerver in my old age, as he was in my youth. If I find myſelf expoſed to poverty and diſtreſs, I hope to remember the days of my helpleſs infancy, that more critical ſtate, in which he protected me. If I meet with ingratitude from a friend, even *that* ought not to make me unhappy. He who created me can raiſe up other friends, in whoſe tenderneſs I may enjoy delight and comfort. If my days be full of danger, and perſecution be my lot, even theſe ought not to terrify me; I ſhould put my truſt in that power which protected my childhood when it was expoſed to many dangers.

LESSON

LESSON II.

DAILY PROOFS OF AN UNIVERSAL PROVIDENCE.

NOT to acknowledge the hand of Providence, but in extraordinary caſes, is to betray our ignorance and our weakneſs. In the ordinary courſe of nature, things daily offer which ought to excite our attention and our admiration. The formation of a chicken in an egg is as great a miracle of the power and wiſdom of God, as the creation of the firſt man formed out of the duſt. Likewiſe the preſervation of our life, if we reflect on the ſeveral cauſes and effects which combine for that purpoſe, is no leſs wonderful than the reſurrection of the dead. The only difference between them is, that one happens but ſeldom, while we every day witneſs the other. This is the reaſon it does not ſtrike us more ſenſibly, or raiſe our admiration as it would otherwiſe do. Undoubtedly, my own experience ought to convince me fully, that a Divine Providence watches over the preſervation of my days. I am not certain of a ſingle moment of my life. I feel how incapable I am of preſerving my life, or of removing ſuch and ſuch infirmity, or ſuch and ſuch danger, with which I am threatened. Subject to ſo many wants, both mental and bodily, I am thoroughly convinced, that, were it not for the tender mercies of God, I ſhould be a very wretched creature. The union of my body and ſoul, their reciprocal and continual acting on each other, are inconceivable, and neither depend on my will or power. The beating of my pulſe, the circu-

lation of fluids within me, goes on without interruption, and without my being able to contribute to it in the ſmalleſt degree. Every thing convinces me that my faculties, my ſtate, the duration of my exiſtence, does not depend on my will. If my breath be not ſtopped; if my blood ſtill circulates; if my limbs have not yet loſt their activity; if the organs of my ſenſes have preſerved their play; if, in this inſtant, I have the faculty of thinking, and the uſe of my reaſon; it is to God alone that I am indebted for it. But, why do I reflect ſo ſeldom, and with ſo little gratitude, on the daily ways of Providence? Ought not the reflections which now offer themſelves, to have always been imprinted on my heart? Ought I not, at leaſt, every morning and evening of my life, to meditate on the benefits of my Creator; admire and bleſs him for them? How juſt that I ſhould do ſo? and that, by this homage, I ſhould diſtinguiſh myſelf from the inſenſible brute, from thoſe creatures who have not received the faculty of contemplating the works of their Creator.

Divine Preſerver of my life! teach me to contemplate worthily the miracles of thy goodneſs. And when thou granteſt me a favour, however ſmall it may be, may I feel the value of it; may it lead me to glorify thee, and to adopt the words of a holy patriarch: "I am nothing in comparison of all the goodneſs and mercy with which thou haſt acted towards thy ſervant."

LESSON

LESSON III.

THE CARE WHICH PROVIDENCE TAKES OF ANIMALS DURING THE WINTER SEASON.

MILLIONS of rational beings, diſperſed in the different countries of the world, are provided at this ſeaſon with all the neceſſaries of life. The greater the number of them is, the greater variety of wants they have, according to their condition, their age, their manner of living. The leſs we are able to form a plan, and take ſecure meaſures for our own preſervation, the more the arrangements, ſo full of wiſdom and goodneſs, made by our Creator, to provide for it, deſerve our attention and admiration. But there would be a ſort of ſelfiſhneſs in confining the divine goodneſs and wiſdom to the preſervation of mankind alone, without remembering the care that Providence alſo takes of animals during winter. A care which he extends to creatures much greater in number on the earth, than the rational beings who inhabit it.

However wonderful the preſervation of human creatures may be, we can ſay, with truth, that the cares of Providence towards animals are ſtill more aſtoniſhing proofs of wiſdom, power, and goodneſs.

That the prodigious number of animals which our globe contains, ſhould find food or habitation in ſummer, is not ſurpriſing, becauſe all nature then is diſpoſed to concur towards that end. But that in this ſeaſon, the ſame number of creatures, thoſe millions of quadrupeds, of reptiles, of birds, of inſects, and fiſhes, ſhould continue to exiſt, is a circumſtance which muſt excite the aſtoniſh-

ment of every one capable of reflection. Nature has provided moſt animals with a covering, by means of which they can bear the cold, and procure themſelves food in winter, as well as in ſummer. The bodies of wild beaſts, which inhabit foreſts and deſerts, are ſo formed, that the hair falls off in ſummer, and grows again in winter, till it becomes a fur, which enables the animal to endure the moſt ſevere cold. Other kinds of animals find an aſylum under the bark of trees, in old crevices, in hollows of rocks, and caves, when the cold obliges them to quit their ſummer dwelling.

It is there, that ſome carry before-hand the food which is to ſerve them, and thus live on what they have gathered in the ſummer; others paſs the winter in profound ſleep. Nature has given to ſeveral ſorts of birds an inſtinct which prompts them to change place at the approach of winter. They are ſeen flying in great numbers into warmer climates. Several animals, who are not deſigned to travel, find, notwithſtanding, their wants ſupplied in this ſeaſon. Birds know how to find out inſects in moſs, and in the crevices of the bark of trees. Several kinds of quadrupeds carry proviſion in the ſummer time into caves, and feed on it in winter. Others are obliged to ſeek their ſubſiſtence under the ſnow and ice.

Adore, with me, our almighty and gracious Preſerver, whoſe goodneſs and majeſty does not make him diſdain attention to the weakeſt creature exiſting under the heavens.

From the elephant to the mite, all animals owe to him their dwelling, their food, and their life; and even where nature herſelf ſeems barren

of

of resources, he finds means to make amends for her poverty.

How can anxiety, care, or anguish, get access into *our* hearts, or make *us* despair of being preserved during the winter.

In fine, let these reflections lead us to imitate, as much as our faculties will permit, the generous cares of Divine Providence, in contributing to the preservation and happiness of our fellow-creatures, and even to the welfare of every living animal. To be cruel towards animals, to refuse them food, and indispensible conveniences, is to act manifestly contrary to the will of our common Creator, whose beneficent cares extend even to those beings which are inferior to us. And, if animals have a real right to our attention, how much more are we obliged to soften, as well as we can, the evils of our fellow-creatures? Let it not be sufficient for us to supply our own wants, but let us endeavour to supply those of others; and never suffer any one to sink under misery, whom it was in our power to relieve.

LESSON IV. SECOND WEEK.

VEGETABLES WHICH PRESERVE THEIR VERDURE IN WINTER.

THE earth may now be compared to a mother who has been robbed of those children from whom she had the best hopes. She is desolate, and deprived of the charms which varied and embellished her surface. However, she is not robbed of all her children. Here and there, some vegetables are still to be seen, which seem to defy the severity of the winter. Here the

wild hawthorn ſhews its purple berries; and the laureſtina diſplays its bloſſoms in cluſters, crowned with leaves which never fade. The yew-tree riſes like a pyramid, and its leaves preſerve their verdure. The weak ivy ſtill creeps along the walls, and clings immoveable, while the tempeſt roars around it. The laurel extends its green branches, and has loſt none of its ſummer ornaments. The humble box ſhews here and there, in the midſt of the ſnow, its ever-green branches. Theſe trees, and ſome others beſides, preſerve their verdure in the coldeſt climates, and in the ſevereſt ſeaſons. They are emblems of the durable advantages which *he* poſſeſſes whoſe mind is cultivated, and whoſe temper is ſweet and ſerene. The ſplendor of dreſs, which only dazzles the eyes of the vulgar, is a trifling and tranſient ſplendor. The moſt brilliant complexion will fade, and all outward beauty is of ſhort duration; but virtue has charms which ſurvive every thing. The man who fears the Lord, is "like a tree planted by the ſide of a "rivulet. It grows and flouriſhes, and its "branches extend far off. It bears fruit in due "ſeaſon, and its leaves fade not."

What a delightful image is this of a pious man! He borrows not his value from the exterior and arbitrary goods of fortune. His true ornaments are in himſelf. The ſtorms of adverſity may ſometimes ſhake him, but they cannot overpower him; and he ſoon riſes again above the ſtormy regions. If he is reduced by misfortune to poverty, he is ſtill rich in poſſeſſion of the favour of God, a good conſcience, and the hope of a bleſſed immortality.

This meditation leads me to the idea of a benevolent old man. In the winter of his life, he

reſembles

resembles the plants which preserve their verdure, even in that season of life. How many storms of fortune has he supported with constancy! How many attracting objects has he seen wither! He yet exists, while most of those of his time have disappeared. A mild cheerfulness is seen in him, the happy remains of his spring.

Shortly will the beauty of my body fade like a summer-flower. Happy, then, if I have no reason to regret the loss of it! Happy, if I find myself adorned with those attractions which have their source from wisdom and virtue, and which will not wither even in the grave!

LESSON V.

THE ADVANTAGES OF THE CLIMATE WE INHABIT.

LET us sensibly feel how happy we are in all respects. For the blessings of our heavenly Father are poured upon us on every side. The prospect of our forests, our meadows, our hills; the pure and temperate air which surrounds us; the day, the night, the seasons of the year, and the variations which attend them; all prove to us the goodness of our Creator, and the greatness of our felicity. Can we then be discontented with the lot which is fallen to us, murmuring that we have not a perpetual summer, that the rays of the sun do not constantly shine upon us, and that an equal degree of warmth is not always felt under our zone! What ingratitude, and at the same time, what ignorance! Indeed, we know not what we wish, nor of

what we complain. It is through careleſſneſs, or pride, that we diſown the goodneſs of God, who has been particularly favourable to our countries? We murmur often at the ſeverity of winter. We are mad enough to envy the inhabitants of places, where this change of ſeaſons is unknown: but it is preciſely the winter, which makes the climate we live in one of the moſt healthy in the world. In hot countries, they are more expoſed to epidemic diſorders, than where the ſun reflects leſs heat; and the people are not ſo long lived as in our climate. Beſides, it is obſerved that men are leſs robuſt, and population not ſo great, as among us. And when the cold is at the higheſt poſſible degree with us, we are ſtill much happier than the inhabitants of thoſe countries, where the cold is ſo much greater, and laſts ſo much longer, that our ſevereſt winters would appear to them to have the mildneſs of autumn. Let us compare, in imagination, our lot with that of the inhabitants of the northern part of our globe. Here ſome rays of the ſun come to brighten our cloudy days, and revive our ſpirits. We ſee the ſucceſſion of the day and night, while many unfortunate creatures paſs many long days in darkneſs.

LESSON VI.

CONTEMPLATION OF THE STARRY HEAVENS.

THE ſky at night preſents us a ſight of wonders which muſt raiſe the aſtoniſhment of every attentive obſerver of nature. But from whence comes it, that ſo few conſider the firmament with attention? I am willing to believe, that

that in general it proceeds from ignorance; for it is impoſſible to be convinced of the greatneſs of the works of God, without feeling a rapture almoſt heavenly. Raiſe your thoughts for this purpoſe towards the ſky. It will be enough to name to you the immenſe bodies which are ſtrewed in that ſpace, to fill you with aſtoniſhment at the greatneſs of the artificer. It is in the centre of our ſyſtem that the ſun is eſtabliſhed. That body is more than a million of times larger than the earth. It is one hundred millions of miles diſtant from it, and notwithſtanding this prodigious diſtance, it has a moſt ſenſible effect upon our ſphere. Round the ſun move ſeventeen globular bodies, ſeven of which are called planets, the other ten, moons or ſatellites; they are opaque, and receive from the ſun, light, heat, and perhaps alſo, their interior motion. Georgium Sidus, Saturn, Jupiter, Mars, the Earth, Venus, and Mercury, are the names of the ſeven principal planets. Of theſe ſeven, Mercury is neareſt the ſun; and for that reaſon is moſtly inviſible to the aſtronomer. As he is near nineteen times ſmaller than our earth, he contributes but little to adorn the ſky. Venus follows him, and is ſometimes called the morning, and ſometimes the evening ſtar. It is one of the brighteſt of the heavenly bodies, whether it precedes the ſun-riſe, or ſucceeds the ſetting-ſun. It is near as large again as our earth, and is about ſixty-eight millions of miles diſtant from the ſun After Venus comes our Earth, round which the moon moves as a ſecondary planet. Mars, which is the fourth planet, is ſeven times ſmaller than our globe; and its diſtance from the ſun is one hundred and forty-four millions of miles. Jupiter, with his belt,

and four moons or ſatellites, is always diſtinguiſhed by his ſplendor in the ſtarry ſky, and is eight thouſand times larger than our earth. Saturn, who is accompanied by five moons, and a luminous ring, and whoſe diſtance from the ſun is upwards of nine hundred millions of miles, was thought the remoteſt planet until the late diſcovery of the Georgium Sidus, whoſe diſtance is eighteen thouſand millions of miles, and its magnitude eighty-nine times greater than our earth. In the mean time, the ſun, with all the planets which accompany it, is but a very ſmall part of the immenſe fabric of the univerſe. Each ſtar, which, from hence, appears to us no larger than a brilliant ſet in a ring, is in reality an immenſe body, which equals the ſun both in ſize and ſplendor. Each ſtar then, is not only a world, but alſo the centre of a planetary ſyſtem. It is in this light we muſt conſider the ſtars, which ſhine over our heads in a winter night. They are diſtinguiſhed from the planets by their brilliancy, and are called fixed ſtars, becauſe they never change their place in the ſky. According to their apparent ſize, they are divided into ſix claſſes, which comprehend altogether about three thouſand ſtars. And there are innumerable other ſtars, not to be diſcovered by the naked eye.

If we reflect on the diſtance between the fixed ſtars and our earth, we ſhall have new cauſe to admire the greatneſs of the creation. Our ſenſes alone make us already know that the ſtars muſt be further from us than the planets. Their apparent littleneſs only proceeds from their diſtance from the earth. And their prodigious diſtance and their brightneſs tell us,—they are ſuns which reflect, as far as to us, not a borrowed light, but their

their own light; ſuns, which the Creator has ſown by millions in the immeaſurable ſpace; and each of which is accompanied by ſeveral terreſtrial globes, which it is deſigned to illuminate.

Let us ſtop here, then, and reflect, how great muſt be that Being who has created thoſe immenſe globes! who has regulated their courſe, and whoſe mighty hand directs and ſupports them! And what is the clod of earth we inhabit, with the magnificent ſcene it preſents us, in compariſon of the beauty of the firmament? If this earth were annihilated, its abſence would be no more obſerved than that of a grain of ſand from the ſea ſhore. What are provinces and kingdoms in compariſon of thoſe worlds? Nothing but atoms which play in the air, and are ſeen in the ſun-beams. And what am I, when I reckon myſelf among this infinite number of God's creatures? How am I loſt in my own nothingneſs! But however little I appear in this, how great do I find myſelf in other reſpects!—"How beautiful this ſtarry firmament, which God has choſen for his throne! What is more admirable than the celeſtial bodies! Their ſplendor dazzles me; their beauty enchants me. However, all beautiful as it is, and richly adorned, yet is this ſky void of intelligence. It knows not its own beauty; while I, mere clay, whom God has moulded with his hands, am endowed with ſenſe and reaſon." I can contemplate the beauty of thoſe ſhining orbs: ſtill more, I am already, to a certain degree, acquainted with their ſublime Author; and I partly ſee ſome rays of his glory. I will endeavour to be more and more acquainted with his works, and make it my employment, till,

till, by a glorious change, I rise above the starry regions.

LESSON VII. THIRD WEEK.

THE ADVANTAGES OF NIGHT.

WE are, it is true, deprived of some pleasures, now that the sun withdraws its light from us so soon, and that the greatest part of our time is passed in darkness. Nevertheless, we have no cause to complain of this arrangement in nature. As the mixture of pleasure and pain, of good and evil, is always wisely ordained; so do we find the same provident goodness of our Creator in this remarkable variation in our climate. Should we be as well convinced as we are of the use of the sun; and would its light excite in us the same sensation of pleasure, if the being deprived of it did not lead us to feel the advantage of it? Each night may remind us of the mercy of the Almighty, who, for the good of mankind, has spread light and beauty over the earth. It may remind us of the misery in which we should languish, if day did not succeed the darkness. And doos not even darkness obtain for us a great advantage, by inviting us (from the tranquillity and repose which attends it) to enjoy a sweet sleep? In general we are too selfish, in measuring the advantages and inconveniences of night, merely by the use or hurt we think we draw from it. If long nights are disagreeable to some, to how many others are they a blessing? Without the night the astronomer could not have formed an idea of the distance, the

the ſize, the courſe, and the infinite number of planets and ſtars; nor could the pilot make uſe of the northern ſtar. Conſidered in another way, night ſtill appears to me a benefit to mankind, in leſſening our wants, and in putting an end to thoſe which, in the day time, coſt us many cares. What expence does not conveniences and cuſtoms require, without which we ſhould ſcarce think we enjoyed life? How many families, oppreſſed with want, begin the day with anxiety, and end it in hard labour! Night comes and ſuſpends care and miſery. To be happy, nothing but a bed is wanting; and if ſleep cloſes our eyes, all our wants are ſatisfied. Night, in ſome degree, equals the beggar with the monarch. Both enjoy a bleſſing which cannot be purchaſed. O how gracious that Being who combines all things for the happineſs of mankind! Moſt things, which are called evils, are only ſo to thoſe who let themſelves be carried away by prejudice and paſſion: whilſt, if they were conſidered as they ought to be, it would appear, that theſe apparent evils are real bleſſings to the world. We may be aſſured, that ſeveral millions of our fellow-creatures, who are in the day-time employed in hard-work, or fatiguing labour; others, who have groaned all day under the yoke of an enemy to humanity, will bleſs God at the approach of night, which brings reſt with it. And let us alſo bleſs him the beginning of each night. We ſhall undoubtedly do ſo, if, having the wiſdom to employ the day well, we acquire a right to a ſweet and ſound ſleep. The ſhorter our days now are, the higher we ought to value every hour, and make a prudent uſe of them. The night approaches, in which it will no longer be in our power to work or act. But that long

night

night will ſtill be to us a bleſſing, if we enjoy in the grave that peace, that reſt, which are the fruits of Chriſtian labours.

LESSON VIII.

THE REPOSE OF NATURE DURING WINTER.

THE winter days are days of reſt to nature. In the preceding months, ſhe employed herſelf in fulfilling the deſigns of the Creator, by labouring in the ſervice of his creatures. How rich was the ſpring in bloſſoms! How many ſeeds it opened! And what abundance of fruit the ſummer has ripened for us to gather in autumn! Each month, each day, we receive ſome preſents from nature. Is there a ſingle inſtant in which ſhe has not pleaſed our ſight, delighted our ſmell, or indulged our taſte; and, has ſhe not often ſatisfied them all at the ſame time? It is for us ſhe has cauſed the graſs to grow; that ſhe has loaded the trees with bloſſoms, with leaves, and with fruit. It is for us ſhe has covered the meadows with corn. For us, the creation is adorned with a thouſand charms. Tired of ſo many cares, nature now reſts; but it is only to collect new force, to be employed again for the good of the world. However, even this reſt, which nature enjoys in winter, is a ſecret activity, preparing in ſilence a new creation. Already the neceſſary diſpoſitions are making, that the earth may recover, at the end of a few months, what ſhe has loſt. Already, the corn ſhoots, which is to ſerve us for food. Already, the fibres of plants inſenſibly open, which are to adorn our gardens and fields.

fields. Here again, O beneficent Creator, I adore thy power and wisdom. The rest which nature takes is not less interesting to us, nor less worthy of entering into the plan of thy wise Providence, than the activity she shews in spring and summer. It has been thy will that each sun should vary the scenes of nature, in the time and manner most proper for the perfection of the whole. If I have been so senseless as to blame any thing in the government of this world, pardon, O God, my temerity. I discover, and am more and more convinced, that all the plans of thy providence, however extraordinary they may appear to my weak reason, are full of wisdom and goodness. At present, that I see the earth covered with a mantle of snow, which keeps it warm, I will reflect on the good that results from it: for how could I promise myself flowers and fruit, if nature did not, at this time, enjoy some rest?—How could I chaunt the harvest hymn, if thou didst not already, under the snow and ice, dispose the seed to flourish? Yes, Lord, it is thou, who, in granting rest to the earth, enricheſt man with a thousand blessings. And for me also, O Father! there will come a day of rest; a day in which I shall rest from all trouble, sorrow, or cares. Thou hast wisely ordained the time I should devote to activity. It is now the spring and summer of my life, which must be employed in the service of my fellow-creatures. The autumn will soon come. Grant, that I may then resemble one of those fruitful trees, which pours upon us fruit in abundance. But in the winter of life, when I shall be covered with grey hairs, and full of days, I could wish that my rest should be as honourable and beneficent as that of nature in winter. How

happy

happy ſhould I be, if my contemporaries ſhould ſay, when ſpeaking of me, That old man formerly devoted his youth to endeavours to ſerve mankind: his life has never been void of activity or of uſe. Now, even his calm old age is not idle: by his wiſe experience, he contributes to the happineſs of his family and friends: he labours at leaſt for the world to come, of which he will ſoon be an inhabitant.

However, the repoſe that I can promiſe to myſelf here is little elſe but a preparation for new troubles. O how I rejoice in that which awaits me in the grave, and in the boſom of eternity!—There, I ſhall enjoy an uninterrupted repoſe:—there, the remembrance of the ſorrows and afflictions, which I ſhall have got over here, will fill my heart with inexpreſſible joy. In the firm hope of that repoſe, which is reſerved for me, I will apply myſelf with zeal to the fulfilling of all the duties to which I am called, and will devote my talents and powers to the glory of my Creator, and the good of my fellow-creatures. Strengthen me, by thy grace, O my God, and my Saviour, in this holy reſolution.

LESSON IX.

THE LAPLANDERS.

I Begin this meditation with a lively ſenſe of gratitude towards my Creator, and of pity to thoſe of my fellow-creatures to whom nature has more ſparingly diſtributed her bleſſings. I fix my eyes now on the Laplanders, and the inhabitants of the lands neareſt the arctic pole: mortals, whoſe taſte and manner of living, when compared

compared with ours, are not the happieſt. Their country is formed of a chain of mountains covered with ſnow and ice, which does not melt even in ſummer; and, where the chain is interrupted, is full of bogs and marſhes. A deep ſnow overwhelms the vallies, and covers the little hills. Winter is felt during the greateſt part of the year. The nights are long; and the days give but a dim light. The inhabitants ſeek ſhelter from the cold in tents, which can be removed from one place to another. They fix their fireplace in the middle of it, and ſurround it with ſtones. The ſmoke goes out at a hole, which alſo ſerves them for a window. There they faſten iron chains, to which they hang the caldrons, in which they dreſs their food, and melt the ice which ſerves them for drink. The inſide of the tent is furniſhed with furs, which preſerve them from the wind; and they lie on ſkins of animals, ſpread upon the ground. It is in ſuch habitations that they paſs their winter. Six months of the year are to them perpetual night, during which they hear nothing round them but the whiſtling of the wind and the howling of the wolves, who are running every where in ſearch of their prey. How could we bear the climate and way of life of thoſe people? How much we ſhould think ourſelves to be pitied, if we had nothing before our eyes but an immenſe extent of ice, and whole deſerts covered with ſnow; the abſence of the ſun ſtill making the cold more inſupportable? And if, inſtead of a convenient dwelling, we had only moveable tents made of ſkins; and no other reſource for our ſubſiſtence, but in painful and dangerous hunting for it? If we were deprived both of the pleaſures which the

the arts produce, and the ſociety of our fellow-creatures to ſweeten life.

Are not theſe reflections proper to make us obſerve the many advantages of our climate, ſo little attended to? Ought it not to animate us to bleſs the Divine Providence, for delivering us from ſuch diſtreſſes and inconveniences, and for diſtinguiſhing us by a thouſand advantages? Yes: let us ever bleſs that wiſe Providence: and when we feel the ſeverity of the ſeaſon, let us return thanks, that the cold is ſo moderate where we dwell, and that we have ſuch numerous ways of guarding againſt it. Let us alſo bleſs the Almighty Governor of the univerſe, by granting us, in the midſt of the deſolate image which winter preſents, the delightful proſpect of ſpring, the very idea of which comforts and enables us to ſupport the preſent evil.

But is the inhabitant of northern countries ſo unhappy as we imagine? It is true that he wanders painfully through rough vallies and unbeaten roads, and that he is expoſed to the inclemency of the ſeaſons. But his hardy body is able to bear fatigue. The Laplander is poor, and deprived of all the conveniences of life; but is he not rich, in knowing no other wants than thoſe which he can eaſily ſatisfy? He is deprived for ſeveral months of the light of the ſun; but to make the darkneſs of night ſupportable, the moon and the Aurora Borealis come to light his horizon. Even the ſnow and ice, in which he is buried, does not make him unhappy. Education and cuſtom arm him againſt the ſeverity of his climate. The hardy life he leads enables him to brave the cold: and for the particular wants which are indiſpenſable to him, nature has made

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it eafy for him to obtain them. She has pointed out to him animals, whofe fur faves him from the fharpnefs of the air. She has given him the rein-deer, which furnifhes him, all at once, with his tent, his drefs, his bed, his food, and his drink; with which he undertakes long journies, and which, in a word, fupplies almoft all his wants, and the maintenance of it is no expence or trouble to him. If, in the midft of all the mifery of their condition, thefe poor mortals had a more perfect knowledge of the Supreme Being, a knowledge fuch as revelation gives us; if lefs favage and infenfible, they could draw from friendfhip thofe fweets which improve life; if it were poffible, I fay, to join thefe precious advantages to the tranquillity of mind which forms their character, thofe fuppofed unhappy people, whofe kind of life frightens our depraved imaginations, would not be fo much to be pitied as we think. And, if it is true that the idea we form of happinefs depends more on opinion than on reafon; if it is true alfo that real happinefs is not fixed to particular people, or particular climates; and that, with the neceffaries of life and peace of mind, one may be happy in every corner of the earth; have we not a right to afk, What the Laplander wants to make him happy?

LESSON X. FOURTH WEEK.

THE WISE ORDINANCE OF OUR GLOBE.

HOWEVER limited the human mind may be; however incapable it is of going to the bottom of, or even conceiving the whole of the plan, that the Creator executed in forming our

our globe, we may, notwithſtanding, by the uſe of our ſenſes, and the faculties with which we are endowed, diſcover ſufficient to make us acknowledge and admire the divine wiſdom. To convince us of it, we need only reflect on the form of the earth. It is known to be almoſt in ſhape like a ball. And, with what view did the Creator chooſe that form? In order that it ſhould be inhabited, over the whole ſurface of it, by living creatures. God would not have accompliſhed this purpoſe, if the inhabitants of the earth had not every where found ſufficient light and heat; if water had not been eaſily ſpread in all parts of it; and, if the circulation of wind had met with obſtacles any where. The earth could not have any form more proper to prevent theſe inconveniences. Without this form, the revolutions of the day and night, the changes in the temperature of the air, cold, heat, moiſture, or dryneſs, could not have taken place. When I reflect on the enormous maſs which compoſes our globe, I have new reaſon to admire the ſupreme wiſdom. If the earth was ſofter or more ſpongy than it is, men and animals would ſink into it. If it was harder, more compact, and leſs penetrable than it is, it would reſiſt the toil of the labourer, and would be incapable of producing and nouriſhing that multitude of plants, herbs, roots, and flowers, which now ſpring out of its boſom. Our globe is formed of regular and diſtinct ſtrata; ſome of different ſtones, others of ſeveral metals and minerals. The numerous advantages which reſult from them, particularly in favour of mankind, are evident to all the world. Where ſhould we have ſweet water, ſo neceſſary to life, if it was not purified, and in a manner filtered, by the ſtrata of gravel which

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are ſunk a great depth in the earth? The ſurface of the globe offers a varied proſpect; an admirable mixture of vallies and mountains. Who is there that does not ſee clearly the wiſe purpoſes of the Author of nature, in thus diverſifying this ſurface? How favourable is this variety of valley and mountain to the health of living creatures! How much more proper to produce the various ſpecies of plants and vegetables! If there were no hills, the earth would be leſs peopled with men and animals: we ſhould have fewer plants, fewer ſimples and trees: we ſhould be totally deprived of metals and minerals: the vapours could not be condenſed; and we ſhould have neither ſprings nor rivers.

Who can help acknowledging that the whole plan of the earth, its form, its exterior and interior conſtruction, are regulated according to the wiſeſt laws, which all combine towards the pleaſure and happineſs of living creatures!

Supreme Author of nature, thou haſt ordered every thing on earth with wiſdom! Wherever I turn my eyes; whether I examine the ſurface; whether I penetrate into the interior ſtructure of the globe thou haſt appointed me to inhabit; I every where diſcover marks of profound wiſdom and infinite goodneſs.

LESSON XI.

SUBTERRANEOUS FIRES.

BY digging a little deep into the earth, a greater degree of cold is felt than on the ſurface: becauſe the latter is heated by the ſun. But if you dig fifty or ſixty feet deep, the heat increaſes

increaſes ſenſibly; and, if it is a ſtill greater depth, it becomes ſo cloſe, that it ſtops reſpiration, and puts out a candle. It is not eaſy to determine the cauſe of this heat. Thoſe who admit that there are concealed fires in every place under the earth, approach, perhaps, the neareſt to the truth. But how this fire, ſo cloſely confined, can burn; what the ſubſtance is that feeds it, or how it can be burned without conſuming, is what cannot be determined with certainty. There are phenomena on our globe, which prove the exiſtence of ſubterraneous fires in a very formidable manner. From time to time there are terrible eruptions of fire. The two moſt remarkable mountains which produce ſuch, are Etna, in Sicily, and Veſuvius, in the kingdom of Naples. The accounts given of theſe two volcanos are frightful. Sometimes a black vapour only riſes out of them; at other times a hollow roaring is heard; all at once it is followed by thunder and lightning, attended by an earthquake. Then the vapour clears up, and becomes luminous. Stones fly with violence, and fall again into the gulph which threw them out. Sometimes theſe eruptions are ſo violent, that large pieces of rock are hurled into the air. The force of the interior air of theſe mountains is ſo prodigious, that, in the laſt century, pieces of rocks weighing three hundred pounds were thrown into the air, and fell again at the diſtance of three miles. At certain times, the vitrified entrails of the earth boil up, and riſe, till their formidable foaming runs over at the outſide, and flows for the ſpace of ſeveral miles through the neighbouring fields, where it ſwallows up every thing in its paſſage. The torrent of fire laſts for ſeveral days. One wave rolls over another

till it reaches the ſea; and even here its violence is ſuch, that it continues to flow for ſome time without being extinguiſhed in the waves of the ocean. Who can think without terror of the diſaſters which ſuch eruptions occaſion? Whole farms and villages, with their fertile plantations, are ſwallowed up. The meadows are conſumed. The olive-trees and vines entirely deſtroyed. We are told, that in one of the eruptions of Etna, the torrent of burning lava ſpread itſelf over fourteen cities; and that the roaring within the mountain was heard at twenty miles diſtance.

But wherefore theſe volcanos, which ſpread ſuch terror and devaſtation on the earth? Why has the Lord created them? Why, inſtead of putting bounds to their fury, has he permitted them thus to diſtreſs his creatures? Who then am I, to dare to aſk ſuch queſtions? Have I a right to demand an account of the plans formed by Supreme Wiſdom? The exiſtence of theſe volcanos cannot be the work of chance; and I ought to conclude, that the Creator has wiſe reaſons for ordering ſuch to be. Beſides, even in this, I find the beneficent hand which provides for the welfare of mankind. Whatever miſchiefs theſe eruptions occaſion, it is nothing in compariſon of the advantage they are, on the whole, to our globe. The boſom of the earth being full of fire, it was abſolutely neceſſary that there ſhould be volcanos, becauſe they are the vents by which the force of the dreadful element is broken and weakened. And though the countries where the ſubterraneous fires collect in greateſt quantities, are ſubject to earthquakes, they would be ſtill more violent, if theſe volcanos did not exiſt. Italy would not be ſuch

a fertile country, if, now and then, the fire which the earth contains had not found a vent in these mountains. And, after all, who knows if those frightful phenomena may not produce other advantages concealed from us, and if the influence of them may not extend over the whole globe? At least, this is enough to convince us, that they contribute to fulfil the designs of our Divine Author, so full of wisdom and goodness. And if there still remain things to us obscure and impenetrable, let us put our hands to our mouths, and say, "Lord, thy judgments are right and equitable, and thy ways impossible to discover."

LESSON XII.

THE RAPIDITY WITH WHICH THE HUMAN LIFE PASSES AWAY.

OUR life is short and transitory. This is an incontestible proposition; though, to judge from the conduct of most people, one would not suppose it a received truth. Let us judge by our own experience; ought not each step we have taken, from our births to this moment, to have convinced us of the frailty of life? Let us consider only with what swiftness the days, the weeks, the months, and the years have passed, or rather flown away. They were over, even before we perceived it. Let us endeavour to recall them to mind, and to follow them in their rapid flight. Is it possible to give an account of the different æras? If there had not been in our lives certain very remarkable moments, which made impression on our minds, we

we ſhould be ſtill leſs able to recollect the hiſtories of them. How many years of our infancy, devoted to the amuſements of youth, which we can ſay nothing of, but that they have glided away? How many others have paſſed in the thoughtleſſneſs of youth; during which, miſled by our inclinations, and given up to pleaſure, we had neither the wiſh, nor the time, to look into ourſelves? To theſe years ſucceeded thoſe of a riper age, more capable of reflection. We then thought it was time to change our way of life, and to act like reaſonable men; but the buſineſs of the world took poſſeſſion of us to ſuch a degree, that we had no leiſure to reflect on our paſt lives. Our families increaſed, and our cares and endeavours to provide for them increaſed in proportion. Inſenſibly the time draws nigh, in which we arrive at old age; and perhaps, even then, we ſhall neither have leiſure nor force of mind to recollect the paſt, to reflect upon the period to which we are come, upon what we have done, or neglected to do; in a word, to conſider the purpoſes for which we were placed in this world. In the mean time, what can inſure our ever attaining that advanced age? A thouſand accidents break the delicate thread of life, before it comes to its full length. The child juſt born falls, and is reduced to duſt. The young man, who gives the higheſt hopes, is cut down, in the age of bloom and beauty; a violent illneſs, an unfortunate accident, lays him in the grave. Dangers and accidents multiply with years; negligence and exceſs lay the ſeeds of maladies, and diſpoſe the bodies to catch thoſe that are epidemical. The laſt age is ſtill more dangerous. In a word, half of thoſe who are born, are carried out of the world and periſh in the

ſhort ſpace of their firſt ſeventeen years. Behold the conciſe, but faithful hiſtory of life! O may we redeem thoſe days, ſo ſhort, and ſo important, in learning how to number them, and make the moſt of the time which flies ſo ſwiftly away! Even while we make theſe reflections, ſome moments are flown. What a precious treaſure of days and hours ſhould we not lay up, if, from the numberleſs moments we have to diſpoſe of, we often devoted ſome of them to ſo uſeful a purpoſe! Let us think of it ſeriouſly; every inſtant is a portion of life impoſſible to recall, but the remembrance of which may be either the ſource of joy or ſorrow. What heavenly enjoyment is it, to be able to look happily on the paſt, and to ſay to one's ſelf with truth, "I have lived ſo many years, during which I have ſown a rich ſeed of good works; I do not wiſh to begin them again, but I do not regret that they have paſſed." We ſhould be able to hold this language, if we fulfilled the end for which life was given us; if we devoted our ſhort ſpace of time to the great intereſts of eternity.

LESSON XIII. FIFTH WEEK.

OUR DUTY IN REGARD TO SLEEP.

A Melancholy remark we have often occaſion to mention, is, that moſt people lie down to ſleep with an inconceivable ſecurity. To conſider it only as far as it relates to our bodies, the revolution produced by ſleep ought to appear to us of great conſequence; but, if we conſider it in ſtill another light; if we were to form to ourſelves all that might happen to us, while we are

are enjoying repoſe, it appears to me, that, in conſequence, we could not, or ought not, to throw ourſelves into the arms of ſleep, without having taken proper precautions, and having, in a certain degree, prepared ourſelves for it. In reality, it is not ſurpriſing, that thoſe who in their waking hours are ſo inconſiderate, ſo negligent of every duty, ſhould be equally ſo in that which relates to ſleep. Let *us*, however, learn in what manner we may glorify the Almighty, and act as becomes the character of a Chriſtian, in this reſpect. What thankſgivings are due to the Creator for the bleſſings of ſleep! Some may not know the full value of it, as it may never have been denied to their wiſhes, when they have deſired it. But, how ſoon would ſickneſs, ſorrow, fear, or old age, deprive them of the ſweets of repoſe! Oh! it is then that they would acknowledge, that ſleep is the moſt preſſing want of nature; and, at the ſame time, an ineſtimable bleſſing of the Deity. But, ſhould they wait till they loſe this bleſſing to become wiſe? No, now, while they enjoy the advantages of ſleep;—and, that the beginning of each night makes them feel its ſalutary effects, never let them give themſelves up to it, without a lively ſenſe of gratitude towards their Heavenly Benefactor. Let this gratitude prevent them equally from making an abuſe of ſleep, or, by a contrary extreme, not making uſe of it. It is always wrong to prolong, through idleneſs, the hours deſigned for repoſe. Nature in this reſpect, as in every thing elſe, is content with a little; and ſeven or eight hours of uninterrupted ſleep is as much as is neceſſary. But, we are not leſs blamable, when, through avarice, ambition, or any other motive of that ſort, we loſe

our ſleep and neceſſary reſt. In both caſes, we act contrary to the rules eſtabliſhed by our Creator, and contrary to the gratitude we owe him for ſuch a bleſſing.

Above all things, let us endeavour to go to ſleep with a proper turn of mind. What ſhould we do, if we were to know for certainty, that, from the arms of ſleep, we were to paſs into thoſe of death? Should we not employ our laſt moments in preparing ourſelves for this paſſage; in recollecting our paſt life; in ſeeking, through the blood of Chriſt, the remiſſion of our ſins? Well then, we may, every night, conſider this caſe poſſible. In each winter's night, that is to ſay, in the ſpace of twelve or fifteen hours, there die many thouſand people. Who can ſay whoſe name is not in the liſt of thoſe which death will remove out of this world? Now, I leave it to the deciſion of every one's heart, what they would have done, if, in the midſt of their ſleep, they had been called upon to appear before the tribunal of Jeſus. If, in the courſe of this night God had diſpoſed of them, would they have been prepared to appear before him? O God, to whom all hearts are open, and from whom no ſecrets are hidden, what can we conceal from thee? We daily feel our weakneſſes. Pardon our ſins, we beſeech thee, and enter not into judgment with us for them.

LESSON XIV.

THE USE OF STARS.

THE ſtarry ſky is an admirable ſcene of the wonders of the Moſt High, in the eyes of every one who loves to reflect on the works of Omnipotence.

Omnipotence. The order, the greatneſs, the multitude, and the brilliant ſplendor of thoſe heavenly bodies, muſt be the moſt pleaſing ſpectacle to an attentive obſerver. The ſight of the ſtars alone, ſuppoſing that we knew nothing of their nature and uſe, would be ſufficient to fill the mind with admiration and delight. For what can be ſeen more magnificent and beautiful than that immenſe expanſe of the heavens, illuminated by numberleſs lights, which the azure ſky makes appear ſtill more brilliant; and which all differ from one another both in ſize and luſtre. But, would a Being infinitely wiſe have adorned the celeſtial vault with ſo many bodies of an immenſe ſize, merely to pleaſe our eyes, and to afford us a magnificent ſight. Would he have created innumerable ſuns, merely that the inhabitants of our little globe might have the pleaſure of ſeeing in the ſky ſome luminous ſpecks, the particular nature and purpoſe of which they very imperfectly know. Such an idea cannot be formed by any body who conſiders, that there is, throughout all nature, an admirable harmony between the works of God and the purpoſes he deſigns them for; and that in all he does, he has in view the advantage, as well as the pleaſure of his creatures. It cannot be doubted, but that God, in placing the ſtars in the ſky, has had much higher views, than that of affording us an agreeable ſight. Indeed, we cannot preciſely determine all the particular ends the ſtars may anſwer; but, at leaſt, it is eaſy to believe, that they muſt be deſigned for the advantage as well as the ornament of the world; and the following conſiderations will be ſufficient to convince us of it. Among the ſtars that are eaſieſt to be diſtinguiſhed, there are ſome which we ſee conſtantly

in the ſame part of the ſky, and are always over our heads. Theſe ſerve to guide travellers by ſea and land, in the darkneſs of night. They point out the way to the navigator, and tell him when he may undertake his voyages with leaſt danger. Other ſtars vary their aſpect; and, though they always hold the ſame ſituation, as to one another, they change the order of their riſing and ſetting, in reſpect to us, from day to day. Even theſe changes, which never vary in their regularity, are of great uſe to us; they ſerve to meaſure time, and to determine it by ſettled rules. The regular revolutions of the ſtars mark preciſely the return and the end of the ſeaſon. The ploughman knows exactly, by this means, when he ought to ſow ſeeds in the earth, and the whole progreſs of the country labours. However conſiderable the uſe of the ſtars is to our earth, it may well be preſumed, that it is not the only, nor the moſt important object, which the Deity propoſed to himſelf in producing ſo many globes of a prodigious ſize. Can it indeed be ſuppoſed, that the wiſe Creator ſtrewed the immenſe expanſe with ſo many millions of worlds and ſuns, merely that the ſmall number which inhabit the earth ſhould be informed of the meaſure of time, and the return of the ſeaſons? Undoubtedly theſe innumerable globes are for more ſublime purpoſes; and each of them has its particular deſtination. All the ſtars being ſo many ſuns, which can give light, animation, and heat to other globes, is it probable, that the Almighty ſhould have given them that faculty for no purpoſe? Would he have created ſtars, whoſe rays can pierce even to the earth, without having produced worlds alſo to enjoy their benign influence? No, certainly: perhaps each of theſe

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fixed ſtars, which we ſee by myriads, has its worlds moving round it, for which it has been created, Perhaps, theſe ſpheres which we ſee above us, ſerve as abodes for different ſorts of creatures; and are peopled, like our earth, with inhabitants, who admire and praiſe the magnificence of the works of God. Perhaps, from all theſe globes, as well as from ours, there riſes continually towards the Creator, prayers and hymns of praiſe and thankſgiving. How ſublime is this thought, that, excluſive of the ſmall number of rational creatures which inhabit this globe, there are innumerable numbers of them in thoſe worlds, which appear from hence to be but mere luminous ſpecks. It muſt be indeed out of the queſtion, that the empire of the Moſt High ſhould not be beyond the limits of our earth. Beyond this world there is an immenſity, in compariſon of which our globe, large as it is, can be but reckoned as nothing. Souls without number exiſt there. All of them magnify the name of our great Creator; and are all as happy as their deſtination admits of; and perhaps aſpire to a better world.

LESSON XV.

THE WONDERFUL MAKE OF THE EYE.

THE eye infinitely ſurpaſſes all the works of the induſtry of man. Its formation is the moſt aſtoniſhing thing the human underſtanding has been able to acquire a perfect knowledge of. The moſt ſkilful artiſt could imagine no machine of that kind which would not be much inferior to what we obſerve in the eye. We

cannot, it is true, perceive clearly the whole art of Divine Wifdom in the formation of this fine organ; but the little we do know is fufficient to convince us of the infinite knowledge, goodnefs, and power of our Creator. The moft effential point is for us to make ufe of this knowledge, weak as it is, to magnify the name of the Moft High.

In the firft place, the difpofition of the external parts of the eye is admirable. With what intrenchment, what defence, the Creator has provided our eyes. They are placed in the head, at a certain depth, and furrounded with hard and folid bones, that they may not eafily be hurt. The eye-brows contribute alfo very much to the fafety and prefervation of this organ. Thofe hairs which form an arch over the eyes, prevent duft or any fuch thing falling from the forehead into them. The eye-lids are another fecurity; and alfo, by clofing in our fleep, they prevent the light from difturbing our reft. The eye-lafhes ftill add to the perfection of the eyes. They fave us from a too ftrong light, which might offend us; and they guard us from the finalleft particles of duft, which might otherwife hurt the fight. The internal make of the eye is ftill more admirable. The whole eye is compofed of coats, of humours, of mufcles, and veins. The tunica, or exterior membrane, which is called *cornea*, is tranfparent, and fo hard, that it can refift the rougheft fhocks. Behind that there is another within, which they call *uvea*, and which is circular and coloured. In the middle of it there is an opening, which is called the *pupil*, and which appears black. Behind this opening is the *cryftal*, which is perfectly tranfparent, and compofed of feveral

little

little flakes, very thin, and arranged one over another. Underneath the cryſtal there is a moiſt and tranſparent ſubſtance, which they call the *vitreous humour*, becauſe it reſembles melted glaſs. The cavity, or the hinder chamber, between the cornea and the cryſtal, contains a moiſt humour, and liquid as water, for that reaſon called the *watery humour*. It can recruit itſelf when it has run out from a wound of the cornea. Six muſcles, admirably well placed, move the eye on all ſides, raiſe it, lower it, turn it to the right or left, obliquely, or round about, as occaſion requires. What is moſt admirable is the *retina*, a membrane which lines the inſide bottom of the eye. It is nothing but a web of little fibres extremely fine, faſtened to a nerve or ſinew, which comes from the brain, and is called the *optic nerve*. It is in the retina that the viſion is formed, becauſe the objects paint themſelves at the bottom of the eye on that tunica or coat: and though the images of exterior objects are painted upſide down on the retina, they are ſtill ſeen in their true poſition. Now, in order to form an idea of the extreme minuteneſs of this picture, we need only conſider, that the ſpace of half a mile, that is to ſay, of more than eleven hundred yards, when it is repreſented in the bottom of the eye, makes but the tenth part of an inch.

I return thee thanks, O Lord, for having formed my eye in ſo wonderful a manner. My ſoul acknowledges thy infinite power, goodneſs, and wiſdom. Hitherto I have not conſidered my eye as I ſhould have done, that is, as a maſterpiece of thy hands, and as a demonſtrative proof, that even the moſt minute parts of my body are not the work of chance, and that thou haſt

formed them for moſt uſeful purpoſes. But I begin to ſee a little the wonders of thy wiſdom; and I am ſtruck with aſtoniſhment in reflecting on myſelf and all the works that thou haſt done. O wiſe and almighty Creator! pardon me, if hitherto, in making uſe of my eyes, I have not thought of thee with the higheſt gratitude. Diſpoſe me thyſelf to remember thy bleſſings. Teach me to uſe them only for the purpoſes thou deſignedſt them; and never to profane or diſhonour theſe fine organs by any fault of mine. Grant that hereafter I may often employ them in examining thy works; and that every time I contemplate either the heavens or the earth, or myſelf, I may be induced to praiſe and bleſs thy wonderful goodneſs. And when I ſee the many evils and miſeries of great part of my fellow-creatures, let not my eyes refuſe them tears, nor my heart be ſhut to compaſſion. Thus ſhall I fulfil the views of thy goodneſs, and make myſelf worthy thy approbation.

LESSON XVI. SIXTH WEEK.

ON FOGS.

AMONGST the many meteors ſeen in winter, one of theſe which merits particular attention is the fog. It is a heap of watery and ſulphureous vapours, which fill the lower region of the air, and thicken there. This condenſation is principally occaſioned by cold; and in order to form fogs, the air muſt be ſenſibly colder than the earth, from whence there ariſes continual exhalations. All that we ſee, far or near, the ſky or earth, appears confuſedly wrapped

ped up in a grey curtain. The eye wanders every where, without being able to diſtinguiſh objects. The riſing ſun labours a long time to pierce through theſe fogs, and to reſtore the earth to its former appearance. It ſucceeds at laſt in diſſipating theſe vapours. Sometimes they light upon the earth, and ſometimes they aſcend into the middle region of air. By degrees, the objects riſe out of that obſcurity, and appear again in their uſual ſtate. The ſky reſumes all its brightneſs, all its ſerenity; and it is only near the ground, or on the roofs of houſes, that any traces remain of the fog, which had for ſeveral hours covered the horizon. At the ſight of this meteor, I recollect thoſe unhappy times, when the ſciences were in a manner wrapped up in an impenetrable miſt of ſuperſtition and ignorance. In what thick darkneſs whole provinces and kingdoms were plunged before the ſun of truth could ſhew itſelf in all its ſplendor. The human underſtanding was ſo limited and ſhort-ſighted, that it ſcarce comprehended the things which immediately ſurrounded it; and the power of error was ſuch, that no ray of light could penetrate into thoſe ſouls, darkened by prejudice and ſuperſtition. At length the ſun appeared again, and ſuddenly enlightened countries, which, during whole ages, had been buried in thick ſhades. We learned to diſtinguiſh error from truth. A happy futurity, eternity itſelf was opened to us, and we began to feel the greatneſs of our lot.

It is however but too true, that as long as I remain here, during the days of my earthly pilgrimage, I ſhall ſtill walk in darkneſs. The miſt which ſurrounds me does not permit me to have a clear and diſtinct view of futurity. My ignorance, my prejudice, my credulity, ſtill increaſe

increaſe the darkneſs of my preſent ſtate. O may they ſoon be diſſipated! May the light of truth and joy enlighten me in this vale of darkneſs! But thanks to God, a way is open to me, and I ſee through the ſhades which ſurround me, the path that leads to a bleſſed eternity. Every cloud will ſoon vaniſh, and I ſhall be tranſported to a ſcene of light and felicity which no ſhade will ever darken. There I ſhall know, by the light of heaven, what had appeared on earth dark and gloomy. There I ſhall feel the wiſdom and holineſs of thoſe ways of Providence which were here incomprehenſible to me. There, my ſoul, penetrated with admiration and gratitude, ſhall behold the wonderful chain, and perfect harmony in the works of the Moſt High.

LESSON XVII.

THE RAIN WATERS THE EARTH AND MAKES IT FRUITFUL.

THE fertility of the earth depends chiefly on the moiſture it receives from rain and other watery vapours. If the watering of the earth was left to the care of man, notwithſtanding his efforts, drought and famine would deſtroy us. How neceſſary, therefore, was it, that the vapours ſhould be collected into clouds, as in reſervoirs, and fall afterwards, by the aſſiſtance of the winds, upon the earth, to water the trees and plants. Every ſhower of rain enriches the earth. The treaſures which its ſurface prodigally beſtows upon us are infinitely more valuable to us than all the metals and precious ſtones it contains in its bowels. Society might ſubſiſt very well

well without gold or ſilver, but not without corn, vegetables, and paſture.

Let us reflect on the inexpreſſible bleſſings that rain produces on our globe. A ſeaſonable ſhower renews the face of the earth, and has much more force and effect than the dew, which in the night-time moiſtens the graſs and the leaves. The furrowed fields drink with avidity the beneficent rains poured upon them. The principles of fertility unfold themſelves in the ſeeds, and ſecond the labour of man. The huſbandman ploughs, ſows, and plants, and God gives the increaſe. Men do what is in their power; and whatever is beyond their ability, the Lord himſelf provides for. In winter he covers the ſeed as with a garment. In ſummer he warms and refreſhes it by the rays of the ſun, and by rain. He crowns the year with his bleſſings, and he grants them ſo ſucceſſively, that mankind are not merely nouriſhed, but their hearts are filled with joy and gladneſs. The divine bleſſing does not fall on cultivated fields only; it extends alſo over the meadows and fields of the deſerts. The countries even that are forſaken by man, and from which no direct uſe is drawn, are ſtill objects of providential care: for ſuch is the goodneſs of God, that the hills and the valleys rejoice, and are adorned with ſmiling verdure. The rain does not fall in vain upon them. And if they do not yield fruit for our ſupport, they are, at leaſt, immenſe reſervoirs of water for our earth; and they produce a great variety of wholeſome plants and ſimples good for our health, and which ſerve alſo as food for animals.

Never let us forget God's bleſſings. Let us learn to know the full value of them, and conſider how gloomy, barren, and deſert all nature would

would be, if the ſky had been to us like braſs, and the earth as iron. All the plants and trees would periſh; every living creature would faint; the rivers would dry up; and we ſhould breathe death in the air. And yet we complain or murmur when the winter rains are heavy, or laſt any length of time. We raſhly cenſure the government of the Almighty. Ah! rather let us bleſs the Creator, and praiſe his goodneſs towards us. By his order the ſeaſons are renewed, and regularly ſucceed each other. It is for us that the rain falls, and makes the earth fruitful. God opens his liberal hand to do good to man. His bleſſings light upon our land, and fill it with peace and plenteouſneſs. Let us then adore our Creator, and ſing to his glory hymns of praiſe and thankſgiving. What has he not already done for us, and what may we not ſtill expect from his goodneſs.

LESSON XVIII.

THE EQUAL DISTRIBUTION OF THE SEASONS.

WHEN the ſun is far from us, and when the ſevere cold binds and ſhuts up our earth, there are ſome countries where the inhabitants enjoy all the beauties of ſpring; others, where they are gathering rich harveſts; and others, in fine, where autumn fills their granaries with fruit. It is in this manner that Divine Wiſdom has regulated the change of ſeaſons, and diſtributed the ſame favour to all his creatures, at different times. His impartial love extends itſelf over every being he has made, without reſpect to rank, nation, or merit. It is

is ſufficient that they require his bleſſings, for him to take pleaſure in granting them. His beneficent views extend over the deſerts of Arabia, with as much goodneſs, as over the ſmiling countries of Europe; and his government is the ſame from pole to pole. But if the Deity diſtributes the pleaſures of this life equally, why are ſome countries deprived of the pleaſures of ſpring, while we enjoy them in ſuch abundance? Why are the rays of the ſun ſo partially ſpread, that, in ſome climates there is darkneſs, and in others light, for whole months together? Why are not the frozen countries near the pole as beautiful and fertile as our plains and valleys? What art thou, O man, who dareſt to aſk ſuch queſtions? What right haſt thou to demand an account of the infinitely wiſe Being, for the manner in which he rules the world? Vain mortal, learn to be humble, and to acknowledge traces of a ſovereign wiſdom, in the very things, wherein thy weak underſtanding imagined there were defects. Perhaps, thou ſuppoſeſt Providence has refuſed, to certain parts of the earth, advantages and happineſs, which have been laviſhed with profuſion elſewhere. Not ſo: the Creator has given to each country what was neceſſary to the life, ſupport, and content of his creatures. All is planned according to the climate in which they live; and Providence has, every where, provided for their preſervation and ſupport. The hours of the day vary in different parts of the world, according to certain rules; but all the zones have nearly the ſame number. There is ſcarce any inhabited country, which the ſun ſhines more upon than another. All the difference is, that they enjoy it at different times. With the inhabitants of the torrid zone, the days

days and nights are always of equal length; while, with the neighbouring zones, that is the caſe but twice a year. It is true, that the ſun quits them by turns, and gives ſummer to one ſide of the earth, while it abandons the other to winter. But it never fails to return regularly, from one of the limits of its annual courſe to the other; and, if the winter days are ſhorter than the nights, ſummer makes ample amends in that reſpect. Even the inhabitants of the frigid zone, who are deprived of the ſight of the ſun for ſeveral months, ſee it afterwards on their horizon ſeveral following months; and though they have ſome hours leſs of day-light, they are made amends for it by long twilights.

Lord! the earth is full of thy mercies. Thy goodneſs is ſpread over all the heavens, and extends to the very clouds. What country is there in the whole univerſe, which has not experienced the effect of thy goodneſs? What province, throughout thy immenſe empire, is there, in which there may not be ſeen traces of thy beneficence? Where is the creature, where is the man, who, at each ſeaſon, cannot ſee and feel how good thou art? I rejoice at living under thy merciful government. I rejoice in the numberleſs bleſſings, which thou ſcatterest over all the earth, for the happineſs of thy creatures. How is it poſſible I ſhould not wiſh, that all my fellow-creatures, throughout the world, may be as happy, as tranquil, and content as I am? Yes, thou knoweſt; thou, O Lord, who ſeeſt my heart, thou knoweſt that I am neither covetous nor ſelfiſh enough to behold, with regret, the happineſs of others, or not to wiſh their welfare equal to my own. O God of mercy, grant that I may become more and more like thee. As thou

thou loveſt all thy creatures, and as, without reſpect to perſons, thou doeſt to each all the good they are capable of enjoying, be pleaſed to kindle in my heart the ſame univerſal love for my fellow-creatures, that I may do them all the good in my power; and, at leaſt, that I may raiſe to thee my ardent prayers for all mankind, without exception.

LESSON XIX. SEVENTH WEEK.

THE UTILITY OF OUR SENSES.

I Have ſenſes, that is to ſay, I am a being, who, by means of ſeveral wonderful organs of my body, can procure myſelf ſeveral ſorts of ſenſations. By my eyes, I can acquire the perception of light and colours; by my ears, that of different ſounds; by ſmell and taſte, that of agreeable or diſagreeable emanations of ſavours and ſcents, of ſweet and bitter, and other ſuch properties of the body, which I can make uſe of; and laſtly, by my feeling, I have the ſenſe of heat and cold, of wet and dry, of ſoft and hard, &c. Now, I repreſent to myſelf how wretched I ſhould be, if I was deprived of the organs of ſight, hearing, taſte, ſmell, or feeling. If I had not *ſight*, how could I eſcape that multitude of dangers which ſurround me, or form to myſelf any idea of the magnificence of the heavens, the beauty of the country, and all the agreeable objects with which the earth is filled? Without the organ of *hearing*, how could I perceive many dangers at a diſtance? How enjoy harmony and the charms of muſic? How could I, in my youth, acquire ſchool-knowledge, learn languages,

languages, obtain ideas, the talent of reading, and many other faculties, which diſtinguiſh me ſo advantageouſly from the brute creation? If I had been refuſed the organs of *ſmell* and *taſte*, how could I diſtinguiſh, in my food, what was hurtful or otherwiſe? I could not enjoy the perfumes of ſpring, or a number of things, which now afford me ſuch pleaſing ſenſations. And, laſtly, without my *feeling*, how ſhould I be able to diſcover, either in ſleep, or awake, what was hurtful to me? or, how ſhould I be able to attend to my preſervation? I cannot, therefore, give too much praiſe, that I ſee, hear, ſmell, and feel. I adore my merciful Creator. My mouth ſhall glorify him in ſongs of praiſe and thankſgiving. My ears ſhall be open to the univerſal hymn which all nature chaunts to his honour. Oh! may I never be inſenſible to the value of my ſenſes, or make a bad uſe of them. Thou, my Creator, haſt given them to me for the nobleſt purpoſes. How unworthy ſhould I be of thy boundleſs goodneſs, of the admirable formation of my body, if I only employed my ſenſes in brutal enjoyments, without propoſing to myſelf any higher views? How wretched ſhould I be, if I only ſought my happineſs in ſenſuality, and preferred it to the much nobler pleaſures of the mind; for there will come a time, when my eyes will no longer be affected by external objects; when the harmonious ſounds of muſic will no longer pleaſe my ear, nor the moſt exquiſite dainty, or delicious wines, ſoothe my palate. A time will come, when my ſenſes will take no pleaſure or ſatisfaction in any earthly thing. How wretched ſhould I then be, if I knew nothing that could feed my mind, or comfort my ſoul. Divine Spirit, direct and lead me,

me, ſo to make uſe of my ſenſes, that I may never loſe ſight of the great purpoſe of my exiſtence.

LESSON XX.

SINGULARITIES IN THE KINGDOM OF MINERALS.

IT would be difficult, if not impoſſible, for our weak and limited underſtandings, to take in at once the whole kingdom of nature, and to learn altogether the wonderful properties of things. We ſhall, more eaſily, obtain a knowledge of nature, if we begin by ſome ſeparate objects, ſome particular beauties, and dwell firſt on the moſt ſtriking phenomena. Let us then, at preſent, reflect on ſome curioſities among minerals. We ſhall diſcover there, as every where elſe, traces of the infinite wiſdom of the Deity. Amongſt theſe there are few more worthy our attention than the loadſtone. When this ſtone is ſuſpended it turns itſelf conſtantly, one end towards the north, and the other towards the ſouth; and it is in thoſe two ends, or poles, that it has the ſtrongeſt power of attraction. It is remarkable, that it attracts nothing but iron; and that, if two loadſtones are put together, their poles of different denomination, that is to ſay, the ſouthern and northern pole attract one another; whereas, the poles of the ſame name, that is to ſay, the two ſouthern, or the two northern, repel one another, and ſeem to fly from each other.

There are properties found in quickſilver equally wonderful. It takes every form one wiſhes

wiſhes to give it; but it always ends by re-aſſuming its own natural form. In the fire, it riſes into vapour. When it is ſhaken a long time, it changes into duſt. By being diſſolved, it becomes a hard and tranſparent cryſtal; but, it can always be reſtored to its former fluid ſtate. Gold is the firſt and moſt valuable of all metals, not only from its ſcarcity, but from its admirable properties. It is the hardeſt and moſt unalterable of all bodies. It can bear, for two months, being in the hotteſt fire, without any ſenſible loſs in its weight. Its parts are ſo fine, that a grain of beaten gold can cover fifty ſquare inches, in ſuch a manner, that the naked eye may diſtinguiſh on the two ſurfaces, four millions of particles; and, its ductility is ſuch, that, with a ſingle grain, one may draw out a thread five hundred feet long. The wonderful form of common ſalt; the brilliant ſtones; the ſingular figures of the earth where the metals are concealed; the petrified bodies that are often found on the high mountains, ſome hundred miles from the ſea, which is their original ſource; and an hundred other ſingularities in the mineral world, ſeem formed to awaken our curioſity. No employment whatever has more charms, is more ſatisfactory, or has more variety in it, than an attentive obſervation of nature. Suppoſing we were to live ages on the earth, and, that we were to employ every day, every hour, in ſtudying only the ſingularities amongſt minerals, there would ſtill be, at the end of that time, a thouſand things we could not explain, which would remain hidden from us, and would, more and more, raiſe our curioſity. Since our lives ſcarce extend to half an age, let us then make good uſe of the little time granted us; and let us devote it,

as

as much as our firſt duties will permit, to the obſervation of nature; and thus enjoy the moſt innocent and laſting pleaſures of the mind. The ſatisfaction we ſhall find in it will increaſe more and more, in proportion as we reflect more attentively on the views the Almighty has propoſed to himſelf in his works; for the wonders of nature are infinitely more to be admired, and more ſublime, than all the productions of human art. The latter do not always promote our welfare, or make us better: they are often mere objects of fruitleſs admiration. But all the works of nature, and even the moſt ſingular among them, tend to the univerſal good of the world. They exiſt, not only to be ſeen, but alſo to be enjoyed; and all, without exception, proclaim the goodneſs, as well as the wiſdom of God.

LESSON XXI.

WINTER IS THE IMAGE OF OUR LIFE.

IN the winter days there are continual changes. Flakes of ſnow and ſhowers of rain, ſtorms and calms, cloudy days and ſerene ſkies, ſucceed each other. The ſnow has ſcarce covered nature with its brilliant whiteneſs, when the rain comes to deſtroy it. The ſun ſcarce ſhews itſelf, when it again diſappears from us. Are there not the ſame viciſſitudes in the moral world? If many of the days in winter are dark, dull, and gloomy, ſo are many ſcenes through life. But as ſtorms and darkneſs are neceſſary, and conformable to the wiſe laws of nature, ſo are the diſagreeable accidents and the adverſity which we ſometimes experience

experience in the world. Who can prevent the day from being obſcured by dark clouds? or our happineſs from being diſturbed, ſometimes by others, and ſometimes by accidents? How is it poſſible the ſky ſhould be always calm and ſerene? or that our minds ſhould enjoy uninterrupted repoſe? The preſent conſtitution of our nature will as little admit of our being always free from pain and diſagreeable ſenſations, as the conſtitution of the natural world would admit of the air never being loaded with clouds. Paſſions, which often produce good, but often alſo produce bad effects, are exactly in the moral world what ſtorms are in nature: and, as winter and froſt are ſources of fertility, ſo are afflictions and ſufferings the means to attain wiſdom and virtue. Darkneſs teaches us the value of light. A continual light would dazzle and fatigue the ſight. A ſerene day never gives us ſo much pleaſure, as when it has been preceded by dark and cloudy weather. In the ſame manner, we ſhould be leſs ſenſible of the bleſſing of health, were we not taught to feel it by the painful effects of ſickneſs. After all, it is certain, that we in general are too much inclined to exaggerate our evils. The events and accidents which happen to us are ſeldom as melancholy as we imagine. Our ſelf-love, our pride, and our exceſs of delicacy, blind us often to ſuch a degree, that we look on every thing that happens to us as real and great evils; while, on the contrary, we take no notice of our real advantages, and the ſweets which attend us. It is at leaſt certain, that all our troubles ought to be reckoned as nothing, in compariſon of the multitude of bleſſings and pleaſures that are beſtowed upon us by Divine Providence. Thoſe very evils, of which we complain,

complain, will prove real though disguised blessings, if we know how to make a wise use of them; just as the snow, the storms, the frost, and other variations of the seasons, are means which God makes use of to grant us new favours. When the sky has been long dark and stormy, the clouds at length dissipate, and calm and sunshine bring back joy and gladness. The heavier the showers are, the sooner the clouds vanish. The darker they are, the sooner the rays of the sun disperse them. Misfortunes fill up but a short space of our lives, and when they appear to us the heaviest, when we seem sinking under them, it is a proof that they are soon to end.

I will accept then, without murmuring, the portion of evil it has pleased the Almighty to allot me. I should be unreasonable to expect nothing but pleasure and days of happiness. No: let rain and sunshine, darkness and light, succeed alternately through the course of my life, I am, O Lord! resigned to it. If thou thinkest proper to rouse and shake my soul by the storms of adversity, thy will be done! What matter whether the cup that is given me be more or less bitter; that my troubles be more or less durable, while I am on this side the grave. I know in whom I have believed. I know, O my God! that thou wilt one day grant me eternal salvation. Those who sow here below in tears, will reap with songs of triumph. When the short miseries of life are over, I shall find how advantageous they have been to me; and I shall bless my Creator for having conducted me to heaven, through paths of tribulation and sorrow.

These are the thoughts which will support me in every misfortune. As the expectation of spring makes the gloomy appearance of winter support-

able, ſo does the ſweet hope of futurity encourage me to bear with reſignation and fortitude the preſent miſeries. Through the darkneſs of this life, there opens to me the delightful proſpect of an happy hereafter. What I foreſee in eternity already ſheds light on the path through which I walk; and by this way I ſhall imperceptibly arrive at the bleſſed abodes of peace, light, and happineſs.

LESSON XXII. EIGHTH WEEK.

AN INVITATION TO CONTEMPLATE GOD IN THE WORKS OF NATURE.

O Ye who adore with me the Lord, by whom the heavens and the earth were made, come and reflect on his works! Behold the wonders he has done! Acknowledge, and have a lively ſenſe of his mercies! Of all the knowledge we can acquire, this is the moſt important, the moſt eaſy and agreeable. We could diſpenſe with many ſciences which we take ſuch pains to learn; but the knowledge of God and his works is abſolutely neceſſary, if we wiſh to fulfil the end of our creation, and by that means ſecure our happineſs here and hereafter. It is the beſt preparation to underſtand, and to receive as we ought, the goſpel of Jeſus Chriſt, for this reaſon, becauſe, in teaching his diſciples the truths of religion, the Divine Redeemer often ſpoke of the works of nature, and made uſe of the objects which the phyſical and moral world afford, to lead his hearers to reflections on ſpiritual and heavenly things. In general, it is a noble employment, and well worthy of man, to ſtudy the

the book of nature continually; to learn in it the truths which may remind us of the immenſe greatneſs of the Creator, and our own littleneſs; his bleſſings, and the obligations they impoſe on us. It is ſhameful for man to be inattentive to the wonders which ſurround him on every ſide, and to be as inſenſible to them as the brutes are. What employment can be more pleaſing to the human mind than meditations on the admirable works of the Moſt High! To contemplate, in the heavens, the earth, the waters, the night and day, in a word, throughout all nature, the wiſdom, power, and goodneſs of our Creator and Preſerver! What can be conceived more delightful, than to diſcover in the whole creation, in all the natural world, in every thing we ſee, traces of the providence and tender mercies of the Father of all beings! There are no amuſements, no worldly joys, of which we are not ſoon tired. But the pleaſure we feel in contemplating the works of the Lord is a pleaſure ever new. It is in this light I often repreſent to myſelf the felicity of the ſaints in heaven. I ardently wiſh to be with them, becauſe I am perſuaded it is in their ſociety, in their bleſſed intercourſe only, that my inſatiable deſire of increaſing in knowledge and wiſdom, is to be ſatisfied. But, while we are ſtill at a diſtance from this happineſs, let us endeavour, at leaſt, to come as near it as poſſible, by habituating ourſelves now to what will be hereafter, and for evermore, the employment of all the bleſſed ſaints and angels. Let us admire the power and wiſdom of the Creator in each of his creatures. This employment will make us not only happy but virtuous: for, if we have the Moſt High and his works continually in our ſight, with

what love and veneration ſhall we not be penetrated? With what confidence ſhall we not reſign ourſelves to him? Every thing around us, every thing within ourſelves, will ſerve to lead us to God, as the ſource of all; every thing will more and more contribute to inſpire us with piety. Theſe, O Heavenly Father! are the engagements I make before heaven and earth, in preſence of every creature thou haſt formed.—This ſun which ſhines upon me, this air which I breathe, this earth which bears me, and gives me food; all nature, ſo wiſely framed for our wants and pleaſures, ſhall one day riſe as witneſſes againſt me, if I neglect to contemplate and admire thy works.

LESSON XXIII.

THE STATE OF SOME ANIMALS DURING WINTER.

WE do not yet ſee any of thoſe millions of inſects and birds, which, during ſummer, are in the air, in the water, and on the earth. At the approach of winter they diſappear from our countries, where the climate does not agree with them, and where they can no longer find food. The firſt ſtormy day is a ſignal to them to reſt from their labour, to put an end to their active life, and to quit their homes. We miſtake if we go further, and believe that winter deſtroys thoſe animals: they continue to live even in that ſeaſon of the year. Providence ſo provides, that none of them periſh. The body of ſome animals is formed in ſuch a manner, that the ſame cauſes which deprive them of food, make

make ſuch revolutions in them as prevent their requiring any. The cold numbs them, they fall into a ſound ſleep, which laſts till the return of heat opens the earth, cauſes their neceſſary food to ſpring up, and wakens them from their heavineſs. Theſe animals hide themſelves in the ſand, in pits, or hollow places, in the bottom of ponds, or marſhes, where they cannot be found out or diſturbed. Their ſtate is a kind of death, or rather a ſwoon; and they do not revive till the gentle warmth of ſpring penetrates to their retreats. Some ſort of birds, at the approach of winter, undertake long journies, to ſeek in other climates a more temperate air and proper food. Some fly in numbers from one country to another. Several go to Africa, croſſing the Mediterranean, and return the following ſpring to our countries.

Lord, how admirable is thy wiſdom! How tender and beneficent thy mercies to the leaſt of thy creatures. Thou haſt impreſſed upon the mind of ſome animals that wonderful inſtinct, which warns them of the day in which they ſhould abandon their ſummer habitations, in order to paſs their winter in another climate. Thou haſt pointed out to others, the places where they may paſs in ſafety their night of winter in a ſound ſleep. Thou reviveſt them again when the ſeaſon of their new life arrives. Every time I reflect on theſe changes, they lead me naturally to think of what will happen to myſelf at my death; for my ſtate, in ſome meaſure, reſembles that of theſe birds. At the end of my life I ſhall alſo quit my home, my pleaſures, and my companions, to go into a better world. I ſhall alſo reſt and ſleep ſome time, but at the moment of the new creation I ſhall awake;

and, clothed with the ſtrength and beauty of youth, I ſhall begin a life that will be eternal. What happens to animals affords me alſo another edifying reflection: I ſee from thence that Providence watches even over the very ſmalleſt link of the immenſe chain of beings. I diſcover with what fatherly goodneſs it provides for the preſervation of the weakeſt and loweſt of creatures, in ſituations wherein it would appear impoſſible to mere human wiſdom.—Would it not then be doing injuſtice to the wiſdom and kindneſs of my Creator, to doubt his care of me, and to give myſelf up to trouble and anxiety about my ſubſiſtence? Certainly, that God who gives to inſects and to birds their food in due ſeaſon; that God who provides them retreats, and places of reſt in pits and rocks; who directs them to find their food in different countries; that ſame God will take care of me in time of need and diſtreſs. I have a perfect confidence that he will provide all that is neceſſary for me, even when I ſee the leaſt likelihood of it; he will find me a place of refuge where I may reſt in peace.

LESSON XXIV.

THE AURORA BOREALIS.

ONE often ſees in winter, towards the ſpring, a ſort of tranſparent, bright, and variegated clouds in the ſky. From the north there appears a ſplendid light, which comes cloſe to the other clouds. Laſtly, from theſe northern clouds, there dart white rays of light, which reach to the centre of the heavens. This ethereal phenomenon, called Northern Lights, or Aurora Borealis,

Borealis, is ſtill, in ſome reſpects, one of theſe natural effects, the cauſe of which cannot be very exactly determined. Some naturaliſts ſuppoſe it to be a magnetic ſubſtance, which, accumulating and thickening towards the north, may ſhed a certain light at a diſtance. Others think, what is more probable, that the Aurora Borealis is occaſioned by nitrous and frozen particles, which, riſing in the air, and joined to the vapours, and to the fat and oily exhalations ſent forth by the whales, and other immenſe fiſhes, which abound in the north, are lighted up, and made brilliant by that light which the Laplanders almoſt continually enjoy. Laſtly, ſome philoſophers pretend, that this phenomenon is only the atmoſphere inflamed, and a ſtorm not yet come to maturity. The uncertainty in which the beſt informed and moſt learned men are, in reſpect to this phenomenon, is very inſtructive to us. How many things do we ſee in the air, in the ſky, and upon earth, which are ſtill myſteries, even to the very beſt naturaliſts? Theſe phenomena ought to humble the human mind, whoſe pride and vain curioſity often prevent it acknowledging how limited its faculties are. A thouſand inconſiderable things confound the moſt learned in their meditations, and eſcape our inquiries. There are a thouſand objects, which, indeed, we acknowledge to be planned with much wiſdom, and to be very uſeful; but we ſeldom arrive at diſcovering their true principles, their purpoſe, their connexion with the natural world and its ſeveral parts. However, this ignorance does not affect our happineſs; and, after all, uninformed as we may be on this point, and a number of others, we know, at leaſt, that every phenomenon of the phyſical and intel-

lectual world happens only by the will of an allwise, almighty, and perfect Being, who directs them for the good of the universe. We have no occasion to know more in a life so short as ours; and this is doubtless sufficient to induce us to adore and bless him, who is the author of things so wonderful, and so much above our comprehension.

But I ought also to bless thee, O my God! for not having been born in those superstitious and ignorant times, when whole nations were thrown into consternation and terror by these phenomena. This magnificent sight painted to their disturbed imagination whole armies, and battles fought in the air; and they drew most dreadful prognostics from them. The Aurora Borealis was to them a prophet, which foretold, sometimes war, sometimes famine, and sometimes epidemic disorders.

But, for my part, I find, in the mild and majestic splendor of this light, a sign of the power and goodness of Providence. I behold those celestial lights without fear; because I know that the Lord of heaven has not created any thing to be a torment and misfortune to his creatures. And perhaps there are people in the northern countries who draw great advantages from these phenomena, though they so little influence ours.

LESSON XXV. NINTH WEEK.

THE EXTREME SMALLNESS OF CERTAIN BODIES.

THE vaulted sky, the depths of space, and its unlimited extent, those vast bodies which shine in the firmament, the variety of creatures which

which cover our globe, and which fill the air and the water, all thefe declare the glory of the Mighty God, and tell us his power is infinite. But it muft not be fuppofed, that the power and wifdom of the Creator is only vifible in the immenfe fize of the world. Even in the fmalleft objects, in the moft inconfiderable parts of the natural world, the greateft fubjects of admiration are to be found. The conftruction of a grain of fand, feen through a glafs which magnifies objects a million of times, is enough to fill the greateft mind with aftonifhment. Who indeed would not be furprifed to learn, that there is an infect which lives in the midft of a grain of fand which the eye can fcarce difcover? Examine alfo with a microfcope (which magnifies fome millions of times) the mould of a bit of bread; you will fee in it a thick foreft of fruit trees, the branches, leaves, and fruit of which are eafy to be diftinguifhed. But even in your body you may perceive objects of inconceivable fmallnefs, which perhaps you have not yet taken notice of, and yet deferve all your admiration. It is covered with an innumerable multitude of pores, of which the naked eye can only diftinguifh a fmall part. The epidermis, or fkin, refembles the fcale of a fifh; it has been calculated, that a grain of fand would cover 250 of thofe fcales, and that one fingle fcale would cover 500 of thofe interftices, or thofe pores which give paffage to the infenfible perfpiration. Have you ever reflected on the wonderful conftruction of the hairs of your head? as inconfiderable as they appear, they are one of the Creator's mafter-pieces. They are hollow tubes, each of which has its root, a fubftance full of marrow, and feveral little threads which unite them. In that whitifh

matter, that ſcale which food leaves upon the teeth, and which ſettles there (by means of a microſcope magnifying one million of times) a great number of little animals have been diſcovered; and it has been found, that in a ſpace, not larger than a grain of gunpowder, there was a million of thoſe animalcula.

Are not theſe ſo many circumſtances that ought to make us humble in our own eyes, and raiſe our ideas of the Supreme Being? There are, perhaps, a multitude of wonders in our own bodies, which no one has thought of or ſuſpected. How many imperceptible objects may there not be in nature, out of the reach of the microſcope, and of our underſtanding, which, if known to us, would afford new proofs of the greatneſs of God? But the little we know, is more than ſufficient to convince us, that in ſmall things, as well as in great, the power, wiſdom, and goodneſs of the Lord is manifeſted moſt admirably. The ſand of the ſea declares the glory of the Almighty, as well as the expanſe of the heavens, the ſplendor of the ſun, or the fury of the tempeſts. The loweſt worm bids us give glory to its Creator; the trees, in the magnificence of their clothing; the grain and the ſeed, in their minuteneſs, cry aloud with one voice, It is the Lord who hath made us, glory be to our Creator. Even the moſt diminutive creature upon earth reminds us of his greatneſs. I admire thy power and wiſdom, Lord, in the formation of the gnat, as much as in the conſtruction of the elephant; in the humble form of a blade of graſs, as in the majeſtic height of the oak; in a grain of ſand, as well as in the higheſt mountain. No creature thou haſt formed can be unworthy my attention. Who can tell if the

object

object of the moſt inſignificant appearance may not contain the greateſt wonders? A being that the Moſt High hath vouchſafed to form, is it not, from that very circumſtance, worthy of my obſervation?

LESSON XXVI.

THE HOPE OF SPRING.

EVERY day draws us nearer to the pleaſures of ſpring, and gives us hope of the time approaching, in which we may breathe more freely, and contemplate nature with more ſatisfaction and joy. This ſweet expectation is almoſt the only one which does not deceive us, being founded on the invariable laws of nature. The charms of this hope are felt in every heart without diſtinction; for the beggar, as well as the monarch, may behold the ſpring approach with pure joy, and promiſe himſelf ſure pleaſures in it. This hope is not attended with impatience, becauſe it extends very far, and takes in a multitude of objects.—The coming of ſpring procures us a thouſand new pleaſures: the beauty and perfume of the flowers; the ſinging of the birds; and every where the cheerful proſpect of mirth and pleaſure. Moſt earthly hopes are attended with anxieties; but that of ſpring is as ſatisfactory as it is innocent and pure; for nature ſeldom deceives us. On the contrary, her preſents generally ſurpaſs our expectations, both in number and quantity. It is a great bleſſing of Providence, that in all the changes of ſeaſons, and the viciſſitudes of life, we can ſtill nouriſh hope in our hearts. Winter would have been

infinitely more melancholy without this comfortable prospect. Encouraged by the hope of spring, we have patiently borne the inconvenience of cold and bad weather; and are now on the point of seeing that hope abundantly realized. A few more disagreeable days, and the sky will become serene, the air milder; the sun will revive nature, and the earth will re-assume its ornaments.

O most merciful Creator! I return thee thanks for these sources of joy and comfort which thou hast opened to us, to soften the evils of life. With what goodness throwest thou a veil over the future evils which are to happen! while, on the contrary, thou givest a distinct view of the blessings and pleasures designed us. Without hope, the earth would be a vale of misery, and our lives a series of sorrow and pain. But thou hast given us hope, as an agreeable companion through our pilgrimage. When all around us is gloomy, it opens for us a cheerful prospect of futurity, which revives, and enables us to walk with content through the sorrowful paths of life. How often, O Heavenly Father! hast thou not thus raised my dejected heart, and strengthened my courage when ready to fail me! I bless thee for every ray of hope which has animated my soul; for every blessing received, and for all those hereafter reserved for me. What words, indeed, can express the great hopes I may indulge as a Christian! Praised be thy mercy, O Divine Redeemer! which has entitled me to hope a felicity, not confined within the narrow limits of this life. Praise be to thee for the blessed hope thou hast given us of eternity. What would this life be without it! What would be the happiness of this world, if we could not enjoy the delightful hope of everlasting life and eternal

eternal happineſs! Since we have this glorious hope, ought we not to reckon as nothing the evils of this world? What matter how long and ſevere the winter of our lives? Let us hope for ſpring. Let us await the renewal and perfection of exiſtence in the world to come.

LESSON XXVII.

VARIETY OF MEANS WHICH CONTRIBUTE TO THE FERTILITY OF NATURE.

THE wiſdom of Providence makes uſe of ſeveral means to render the natural world fruitful. Sometimes the clouds fall in rain, in order to purify the air from hurtful vapours, to ſoften the earth, and give it new nouriſhing juices. At other times, when the earth is deprived of the bleſſings of rain, a ſoft dew moiſtens and renders the earth fruitful, revives the feeble plants ready to wither. God has ordained that each ſeaſon ſhould have peculiar means of enriching the earth. The ſnow, which in winter covered our fields and meadows, not only ſerved to guard the earth from the ſevere cold; but, by means of the ſalts with which it is mixed, contributed alſo to the fertility of the land. The frequent ſtorms that are felt in ſpring preſerve the air from corruption, dry the earth, and diſperſe the rain over the whole ſurface of the globe. What benign influence have they alſo upon the earth in making it fruitful; though, during ſummer, they excite the terror of timid and fearful people! With every thunder ſhower the Creator ſpreads his precious bleſſings on the earth. One may, without extravagance, maintain,

tain, with certainty, that there is no revolution in the air, or on the earth, which does not, directly or indirectly, contribute to the fertility of our globe. Each ſeaſon brings back the phenomena peculiar to it; and each phenomenon of nature produces effects, the happy influence of which is more or leſs viſible. Even thoſe plagues which cauſe the entire deſtruction of certain countries are only particular evils, which contribute to fulfil beneficent views, as there reſults from them advantages to the world, when conſidered in the whole.

In all times and places, I acknowledge thy tender care, and the effects of thy mercy, O all wiſe and beneficent Creator! Lord of all times and ſeaſons! Thy praiſe riſes from the orbit of the earth up to the heaven of heavens! Our globe rolls in the ſtarry ſpace, ſometimes ſown with flowers, ſometimes covered with ſnow; here adorned with vines, there crowned with ears of corn. It ſings thy praiſes, and joins its notes with the harmony of the ſpheres. When the ſnow and ice change our fields into deſerts; when the tempeſt roars in the winds; when thy lightnings make mortals tremble; when the rivers, leaving their beds, overflow countries; when all the elements ſeem to conſpire the deſtruction of the world; it is *then* that thou prepareſt for the inhabitants of the earth, health, joy, peace, and plenty.

Here I repreſent to myſelf the different means, by which (if I may uſe the expreſſion) God renders the moral world fruitful. In order to lead mankind to a ſenſe of their deſtination, to a horror of ſin, and to the practice of virtue, the Almighty ſometimes makes uſe of violent, and ſometimes of mild methods. Sometimes he

thinks

thinks proper to punish the sinner severely, to lay heavy judgments, and of a long duration, upon him, in order to awaken him from his slumber. He speaks to hardened hearts, as to the Israelites on Mount Sinai, with lightnings and with a voice of thunder. With others he makes use of opposite measures: he endeavours to snatch them from vice and vanity, and to draw them to him by the gentle ways of blessings and goodness.

LESSON XXVIII. TENTH WEEK.

THE DIFFERENCE BETWEEN ANIMALS AND PLANTS.

THE difference between animals and plants is so great, and so visible, that it requires but a very slight observation to be convinced of it. Undoubtedly, one remarkable difference consists in the animals having the faculty of moving and changing place, a faculty of which the vegetables are totally deprived. A much more essential difference is the faculty of feeling, which cannot be denied to animals, while it cannot be granted to plants. To this must be added, the manner of being nourished, which is still another distinction between them: animals, by means of exterior organs, are capable of choosing their proper food; plants, on the contrary, are obliged to take what nourishment the earth affords, without any choice. This is given them from the moisture of the earth, and by the action of the veins in the leaves, which pump and draw in the nourishing juices with which the air is filled. The number of species is much greater in

in the animal than in the vegetable kingdom.—In the insects alone, there may, perhaps, be a greater number of classes (taking in those which can only be seen with a microscope) than there are of visible plants on the surface of the globe; neither have the animals such conformity with each other as the plants have, whose resemblance makes it difficult to class them. Who can avoid observing another remarkable difference, as to the place where they live? The earth is the only place where plants can grow and multiply; most of them rise above its surface, and are fastened to the soil by roots more or less strong; others are entirely under ground. A small number grow in the water; but, in order to live, it is necessary they should take root in the earth. Animals, on the contrary, are less limited in place. An innumerable multitude people the surface and the interior parts of the earth. Some inhabit the bottom of the sea; others live in the waters at a considerable depth. Many live in the air, in vegetables, in the bodies of men and animals, in fluid matter, and also in stones. If we consider animals and plants, in respect to size, we shall find still a striking difference. Between the size of a whale and that of a mite, the distinction is much greater, than between the highest oak and a bit of moss. Lastly, it is particularly in the form of animals and plants, that the general and most striking difference subsists. Most of the latter have, in that respect, so distinct a character, that it is impossible to confound them with vegetables. However, let us not imagine we have perfectly discovered the limits which divide the animal from the vegetable kingdom, or, that we have found out all that distinguishes them. Nature, to diversify her works,

works, makes uſe of almoſt imperceptible ſhades. In the chain of beings, perfection increaſes ſucceſſively, and riſes by millions of degrees, ſo that a more perfect ſpecies differs very little from that which immediately preceded it. How narrow are the bounds which ſeparate the plant from the animal! There are plants which appear ſenſible, and animals which ſeem deprived of ſenſation. Nothing proves this better than the diſcoveries made in coral. Formerly, it was ſuppoſed that corals were ſea plants, but now, there are ſtrong reaſons for placing them among animals; for, what was then taken for a flower, has proved to be really an animal. The more obſervations are made, the more reaſon is there to be convinced, that it is impoſſible to fix the exact limits of the three kingdoms, the mineral, the vegetable, and animal; and that amongſt moſt creatures there is more conformity than diſſimilarity. It is at leaſt certain, that the limits which divide the moſt perfect creatures, from thoſe that are a degree leſs ſo, become at laſt imperceptible to underſtandings ſo limited as ours. Theſe obſervations ought to convince us that the world, with all the creatures it contains, is the work of an Infinite Being. So much harmony and ſuch differences, ſo much variety with ſo much uniformity, can only proceed from the almighty, omniſcient, and perfect Being, who created the univerſe and all that is in it. Let our hearts riſe towards him. Let us go from the ſtone to the plant, from the plant to the brute, from the brute to man, and from man to the heavenly ſpirits; then take our flight towards the everlaſting, incommenſurable Being, the Creator of the world, the Preſerver of plants, the Protector of animals, the Father of mankind, the King

of

of ſpirits.—Meaſure, if poſſible, meaſure his greatneſs, and try to ſound the depths of his wiſdom. Thrice Holy God! created beings are too weak to know thy works. They are immenſe; and to tell them all, would be to be infinite like thee. Therefore, the leſs capable we are of conceiving how far the wiſdom of God extends, the more we ought to reflect on his greatneſs! and, above all, to imitate his goodneſs as much as is in our power. We ſee that no creature is deprived of the merciful care of the Lord. It is extended to the ſtone and the plant, as well as to men and animals. In his ſight (in ſome reſpects) there is no diſtinction: his mercy is over all his works. Let us, in this alſo, endeavour to imitate our Maker. We fill it is true, a diſtinguiſhed rank among created beings; but, let us take care not to be cruel or tyrannical towards creatures who appear to be inferior to us. Let us rather endeavour to enjoy, with gratitude and moderation, all thoſe deſigned by God for our uſe.

LESSON XXIX.

THE UNIFORMITY AND VARIETY IN THE WORKS OF NATURE.

THE ſky over our heads, and the earth under our feet, remain always the ſame from age to age; and yet they afford us, now and then, ſpectacles as varied as they are magnificent. Sometimes the ſky is covered with clouds, ſometimes ſerene, ſometimes blue, and ſometimes of different colours. The darkneſs of night, and the light of noon-day, the dazzling light of the ſun,

ſun, and the paler light of the moon, ſucceed each other regularly. The immeaſurable ſpace of the heavens appears ſometimes a deſert, and ſometimes ſtrewed with an infinite number of ſtars. To how many changes and revolutions alſo is our earth ſubject! For ſome months uniform, and without ornaments, the ſeverity of the winter robbed it of its beauty; the ſpring renews its youth; ſummer will ſhew it ſtill more rich and beautiful; and, in ſome months after, autumn will pour upon us every ſort of fruit.—What variety alſo on our globe between one country and another! Here a flat level country preſents us plains beyond the limits of ſight; there high mountains riſe crowned with foreſts; at their feet fertile valleys are watered with brooks and rivers. Here gulphs and precipices; there ſtill lakes; and further off impetuous torrents. On every ſide is ſeen a variety which pleaſes the eye, and opens the heart to ſenſations of pure and ſweet delight. This ſame aſſemblage of uniformity and variety is found in all the vegetables on our globe. They take from their common mother all the ſame nature, and the ſame food: they have all the ſame manner of ſpringing up and growing; yet, what a prodigious difference between a blade of graſs and an oak! all together are ranged under certain claſſes. Thoſe of the ſame ſpecies are indeed very like one another; and yet what differences we ſee in them! It is the ſame in reſpect to animals. The wiſdom of the Creator has divided them alſo into claſſes; and whatever variety there is in them, they ſtill preſerve eſſential reſemblances.—There is even a certain degree of conformity between man and the loweſt claſs of animals. However ſuperior man may be to animals

animals in many reſpects, has he not in common with them, and even with plants, the ſame means of food? Is it not the ſun, the air, the earth, and water, which provides it for them all alike? The plants grow, ripen, fade, and die; and thoſe laws of nature extend to animals, and even to mankind. If we next examine the variety of the human ſpecies, what an aſtoniſhing aſſemblage of conformity and diverſity! Human nature, in all times, and among all people, is ever the ſame; and yet we find, that of this innumerable multitude of men ſpread over the earth, each individual has a form peculiar to himſelf; particular talents and countenance, which, to a certain degree, ſerve to diſtinguiſh him from any other—It ſeems as if the wiſdom of the Creator choſe to vary in the higheſt degree all his works, as far as was compatible with the eſſential conſtruction peculiar to each ſpecies. All the creatures on our globe are divided into three claſſes, minerals, vegetables, and animals. Theſe claſſes divide into kinds; the kinds into numberleſs ſorts of individuals. From thence it is, that there is no creature on earth alone, or without reſemblance to its own ſpecies. There is no ſpecies which has not ſome connexion with others, or a general affinity with the reſt of the world. From this aſſemblage of uniformity and diverſity (which is of infinite extent) is derived the order and beauty of the univerſe.—The difference between the countries of our globe, proves the wiſdom of the Moſt High, who choſe that each being ſhould have its certain place, and has ſo fixed their deſtination, that it would be impoſſible to change the connexion or diſtinction he has made between them: even the minuteſt works of nature, ſuch as only can be ſeen

through

through a microſcope, diſcover ſuch union and variety together, as muſt neceſſarily raiſe our ſouls to the contemplation of the infinite wiſdom of the Creator.

LESSON XXX.

SEEDS.

ALL vegetables ſpring from ſeeds; but the greater number of theſe are not ſown, and are even inviſible to us. It is nature that diſperſes them. With this view ſhe has furniſhed ſome ſeeds with a ſort of light down, or little feathers, which ſerve as wings for the wind to carry them away, and ſpread them every where. Other ſeeds are ſmall and heavy enough to fall perpendicularly on the earth, and to ſink of themſelves into it. Others of a larger or lighter ſort, which might be carried away by the wind, have one or more little hooks to catch, and prevent them from going too far from their place. And what is ſtill more admirable, is, that nature ſeems to have given to ſome birds the care of planting trees. They ſow the nuts, which afterwards ſhoot and grow. Ravens have been thus ſeen to plant oaks; and this is their method: they make a hole with their bill, and drop an acorn into it, which they afterwards cover with earth and moſs. It muſt not be ſuppoſed they do all this with an intention to plant trees; it is inſtinct alone which prompts them. They bury the acorn for their food; it ſhoots, and becomes an oak.

Let us here admire the wiſe and tender care of Providence. If the ſowing of ſeeds in meadows and

and foreſts had been entirely left to mankind, how inſufficient would have been the means! Obſerve, how, at the return of ſpring, the graſs and flowers ſpring up and adorn the earth, without our having in any degree contributed towards it. But this is not all that is to be admired in reſpect to ſeeds. It is remarkable, that the whole plant, however great it may be, is all concealed in the narrow ſpace of the ſeed. The whole trunk of the oak, its leaves, branches, and root, are already in the acorn. The plants which remain all the year in the ground, how carefully are their bloſſoms and ſeeds encloſed during winter in the buds, where they are well protected, and covered with cloſe coats of curious texture. As for thoſe plants which cannot bear the cold of winter, they are preſerved under ground by their roots or fruit, till the mild warmth of ſpring makes them bud again. Some ſeeds are lodged in the middle of the fruit; others in pods and ſhells. But every ſeed is protected and preſerved in the manner moſt ſuitable to its nature. Every where we may trace the Divine Creator.

LESSON XXXI. ELEVENTH WEEK.

USE OF VEGETABLES.

WHEN I conſider the great number and variety of vegetables, I diſcover in this circumſtance, as in every thing elſe, the beneficent views of my Creator. What, indeed, could he propoſe, by covering the earth with ſo many different herbs, plants, and fruits, but the advantage and happineſs of his creatures? There are

are ſo great a number, and ſuch variety of plants, that they already reckon above thirty thouſand ſpecies of them, and every day there are new ſpecies and new claſſes found. Their increaſe is infinite. For example, who would not be aſtoniſhed, that a ſingle grain of wheat ſhould produce two thouſand others, and that a ſingle ſeed of poppy ſhould multiply to ſuch a degree, that in two or three years a whole field might be ſowed with it. Can we ſuppoſe, that the Almighty had not the advantage of his creatures in view, when he ordained this prodigious increaſe of plants. There can remain no doubt of the Creator's intention, if we conſider the uſe made of vegetables from the remoteſt times. Do not plants and fruit furniſh us every day with the moſt wholeſome and nouriſhing food? Do we not moſtly owe our clothes, houſes, and furniture, to the vegetable world? There is no part of plants that has not its uſe. The roots furniſh medicaments; they ſerve for food and fuel, to make pitch, dyes, and all ſorts of utenſils. Of wood, they make coal, buildings, fires, medicines, paper, dyes, and a vaſt number of inſtruments. The bark even has its utility in medicine, in tanning, &c. The aſhes ſerve to manure and improve the ground, to bleach cloth, to make ſalt-petre; and they make uſe of pot-aſhes in dying. Roſin is uſeful to painters. Pitch and tar are made of it. They make uſe of turpentine in medicine; hard roſin to varniſh, to ſolder, to rub the bow-ſtrings of muſical inſtruments, in order to make them more ſonorous; and they uſe maſtic in perfumes. Flowers pleaſe and delight, both by their colour and ſmell. They ſerve as medicine, and are particularly uſeful in furniſhing bees with wax and honey.

The

The fruits, which ripen by degrees, ſerve for our food, and are eaten either raw, baked, dried, or preſerved. But vegetables are not for the uſe of man alone; they are of ſtill greater uſe to animals, moſt of which have no other food. The reaſon there are ſo many fields, and ſo great variety of herbs and plants, is, that all the different animals may find their proper food.

Where, O Heavenly Father! can expreſſions be found to celebrate thy goodneſs? Who can reckon all the bleſſings the vegetable world affords us? It is at leaſt manifeſt, that all the arrangements thou haſt made, in this reſpect, tend to the uſe of all thy creatures. Thou haſt provided for the wants of every individual. Thou haſt aſſigned to each the plant propereſt for its food and preſervation. There is not a plant upon earth that has not its purpoſe and uſe. What ſentiments, therefore, of gratitude and veneration ought we not to feel, at the ſight of a country, a meadow, a field? Here, thy beneficent cares have united all that is neceſſary for the ſupport and enjoyment of the inhabitants of the earth. Here, every herb and flower, each tree that grows, teaches us thy mercy. I will neither be deaf nor inſenſible to this perſuaſive voice; I will reliſh, I will enjoy thy goodneſs. I will, more and more, place my whole truſt in thee.

LESSON XXXII.

THE CHANGE OF SEASONS.

IN the warmeſt climates, as well as in the coldeſt, there are but two ſeaſons of the year really different. The coldeſt countries have summer

mer about four months; during which the heat is very great, occaſioned by the length of the days. Their winter laſts eight months. Spring and autumn are ſcarce perceptible there; becauſe, in a very few days, an extreme heat ſucceeds an extreme cold; and, on the contrary, the great heats are immediately followed by the moſt ſevere cold. The hotteſt countries have a dry and burning ſeaſon for ſeven or eight months. Afterwards comes rain, which laſts four or five months; and this rainy ſeaſon makes the difference between the ſummer and winter. It is only in temperate climates, that there are four ſeaſons really different in the year. The ſummer heats gradually decreaſe; ſo that the autumnal fruits have time to ripen by degrees, without being hurt by the cold of winter. In the ſame manner in ſpring, the plants have time to ſhoot, and grow inſenſibly, without being deſtroyed by late froſts, or too much haſtened by early heats. In Europe, theſe four ſeaſons are moſt perceptible; and particularly in Italy and in the ſouth of France. By degrees, as we advance towards the north, or towards the ſouth, the ſpring and autumn are leſs marked. From the middle of May to St. John's-Day, it rains leſs frequently; after which, the violent rains return, and continue to the end of July. The months of February and April are generally very uncertain weather. If the melted ſnow and rains remained on the ground, without falling away or evaporating, the water would annually riſe to the height of a foot and three quarters in moſt countries. This change of ſeaſons deſerves our admiration. It cannot be attributed to chance; for in fortuitous events there can neither be order nor conſtancy. Now, in every country throughout the world, the ſeaſons ſucceed each other with the ſame regularity as the nights and days, and change the appearance of the earth preciſely at the appointed

time. We ſee it ſucceſſively adorned, ſometimes with herbs and leaves, ſometimes with flowers, ſometimes with fruit. Afterwards it is ſtripped of all its ornaments, till ſpring returns, and, in ſome degree, revives it. Spring, ſummer, and autumn, provide food for men and animals, in giving them abundance of fruits. And though nature appears dead in winter, that ſeaſon is not without its bleſſings; for it moiſtens and fertilizes the earth, and, by that preparation, makes it fit to produce its plants and fruits in due ſeaſon.

Awake, O my ſoul! to praiſe and bleſs thy Creator and benefactor. It is now that charming ſeaſon begins again, which opens ſuch an agreeable proſpect before us, and makes amends for the ſad winter days that are paſt. The ſpring approaches every day, and with it a thouſand pleaſures and innumerable bleſſings. How many have wiſhed to live to ſee the renewal of nature, and to recover, in the fine days of ſpring, from all they had ſuffered during winter. But they have not had the conſolation to ſee this day, and their lives were ended before the winter was over. More favoured than many millions of my fellow-creatures, who have been carried off by death, I ſtill live, and may indulge the joy with which ſpring inſpires me. But how often have I ſeen this ſeaſon, without thinking of the goodneſs of my Creator, without opening my heart to gratitude and love! And perhaps this is the laſt ſpring I ſhall ſee upon earth. Perhaps, before the equinox returns, I ſhall be in my grave. Let this thought lead me to feel ſo much the more ſenſibly the happineſs granted me, and to redeem, with more care, every moment of this tranſitory life.

LESSON

LESSON XXXIII.

HARMONY BETWEEN THE MORAL AND NATURAL WORLD.

THE wiſdom of the Deity has ordained there ſhould be a great affinity between the world and its inhabitants, to ſhew that the one was manifeſtly made for the other. There is a connexion and perfect harmony in all the Creator's works. Human nature and the ſurface of the earth have very near relations to each other, and a ſtriking analogy. As the bodies of plants and animals form, grow, arrive at maturity, and periſh; ſo are men ſubſervient alſo to this law of nature. As there is a great diverſity of climates and ſoils, ſome barren, and others fruitful; ſo is there an equal variety in the minds, talents, and faculties of men. Such has been the plan of the Creator; and there is in this variety more goodneſs and wiſdom than we think of at firſt ſight. Far from appearing defective, we ſhould find it all perfection, if we had a thorough knowledge of things. If any body was tempted to object to God's not having given the ſame faculties, the ſame degree of underſtanding to all mankind; we might anſwer, Who art thou, blind and weak mortal, that dareſt to queſtion the Almighty on what he has done? Shall the creature ſay to the Creator, Why haſt thou made me thus? We might as well aſk, Why God has not ordained that all the kingdoms and countries on earth ſhould be equally agreeable and fruitful? Why in certain places the ſoil is rich and fertile, while in others it is ſo barren and ungrateful, that all attempts to improve it are thrown away! Let us not doubt that this difference is very right, and worthy our admiration, though it is not always conformable

to our way of thinking. The moſt barren and deſert countries have their uſe and beauty in the eyes of the Creator. It is the ſame in reſpect to the moſt ſavage and uncultivated nations. All hold their proper place in the immenſity of created beings; and their variety ſerves to declare the wiſdom of God, which is infinite. But, as it is evidently the intention of Divine Providence, that the earth ſhould be cultivated, and produce abundance of fruits, for the preſervation of men and animals, as it is for the ſame purpoſe that God has given us the corn to ſow in the ground; ſo alſo, and with more reaſon, does his wiſdom require, that human nature ſhould be cultivated; and that our ſouls ſhould be made fruitful, and enabled to reap the excellent harveſt of virtue and piety. It is with that deſign that he has given to mankind leſſons of true religion; which, if they find a ſoil well diſpoſed to receive them, produce exquiſite fruit, like the corn which is ſowed in fertile ground. From thence it is, that the goſpel alſo can have no efficacy in the world, but in proportion to the natural faculties of men, and the diſpoſitions with which they receive it.

There are ſtill in our days, vaſt countries, barren and uncultivated, although Providence denies them nothing that they require to make them fruitful. It is thus that, notwithſtanding the publication of the goſpel, there are ſtill ſo many people who remain in ignorance. Even among the moſt poliſhed nations of Chriſtianity, the efficacy of the goſpel is unequal, and will ever be ſo, according to the diverſity of characters to whom it is made known. Some do not comprehend it, and have no ſenſe of the ſalutary effects of the truths of our holy religion. Others receive thoſe truths with eagerneſs and joy, but thoſe impreſſions do not laſt. With others, the paſſions and cares of the world ſtifle the divine word. And, laſtly, ſome receive it with an

honeſt

honeſt and upright heart, with wiſdom, with conviction, and ſincerity. It is for them alone, that it becomes "the power of God unto ſalvation."

But to which of theſe do I belong? What impreſſion has the doctrine of ſalvation made upon my ſoul? What fruit has the good ſeed of the goſpel produced in my heart? Theſe are queſtions which my conſcience ought to anſwer honeſtly and ſincerely; but of which my conduct through life will be the beſt proof.

LESSON XXXIV. TWELFTH WEEK.

THERE IS NOTHING NEW UNDER THE SUN.

IT is certain, that in reſpect to us, there happens many new things upon earth. Nature cauſes new flowers to blow every ſeaſon, and other fruits to ripen. The ſcene of nature changes every year. Each day brings new events and new revolutions. The ſituation of objects change daily, or rather preſent themſelves to our ſenſes under different forms. But it is only relatively to our limited underſtandings and knowledge, that it can really be ſaid, there is any new thing under the ſun. Nothing is more certain than the ſaying of Solomon, that, "What has been will be, and what has been "done will be done, and there is nothing new "under the ſun." The Deity, whoſe wiſdom is infinite, has not thought proper to multiply beings unneceſſarily. There are as many as our wants, our pleaſure, or our curioſity require. We cannot even gain a ſuperficial knowledge of all the works of our Creator; much leſs are we able to exhauſt them. Our underſtandings are too weak to conceive a juſt and perfect idea of all created beings. We therefore ſometimes imagine there are many

new things under the ſun; for, as the whole creation is immenſe, and as we cannot take in all the parts of it at once, we fancy, that each point of view we ſee it in for the firſt time, is new, becauſe the Creator has, in every part of the world, made a wonderful variety and diverſity. The world does not require a continued creation to extend to infinity. It is enough that the Being of beings ſhould maintain the order he has eſtabliſhed from the beginning. God is an artiſt who requires but a ſmall number of ſprings to vary the works he has produced; and which are, however, ſo varied, and in ſo great a number, that, though they ſucceed one another, and return with the greateſt regularity, they appear to us ever new. Let us be content to enjoy with gratitude the things he has created, without undertaking to ſound the depths of them, or attempting to take in their vaſt extent. The impoſſibility of our reckoning all the works of the creation, is, in ſome ſort, the ſeal by which we may conclude, that the world is the work of a God; and it is, at the ſame time, a certain proof of the weakneſs of our underſtandings. But have there not been diſcoveries made lately, which were formerly entirely unknown? Do not all the kingdoms of nature now preſent phenomena to us that we had no idea of formerly? The moſt of theſe diſcoveries we owe leſs to our ſagacity than to our wants. In proportion as theſe multiplied, new means were neceſſary to ſupply them, and Providence deigned to furniſh us with thoſe. But the means exiſted before we diſcovered them. The minerals, plants, and animals, which we have lately learned to know, exiſted on the boſom of the earth, or on its ſurface, before the inquiries and labour of man had made them viſible to us. Is it certain, even, that many of the diſcoveries we boaſt the moſt of, were not made by the ancients?

If

If the world was the work of chance, we ſhould now and then ſee new productions: why then do we not ſee new kinds of animals, plants, and ſtones? It is becauſe all has been planned by the infinite wiſdom of the Supreme Being. All that he does is perfect; it does not require to be renewed or created again; there is ſufficient for our convenience and uſe. Nothing was made by chance. All events have been determined by Infinite Wiſdom, and are linked together in one chain. The whole fabric of the world is preſerved by the providence of its Creator, and by the concurrence of laws both general and particular. All is ſtamped with wiſdom, order, and greatneſs. In all, and by all, the Moſt High is praiſed and magnified. To him be glory, now and for evermore.

LESSON XXXV.

CIRCULATION OF THE SAP IN TREES.

THE trees, which for ſeveral months appeared quite dead, begin inſenſibly to revive. Some weeks hence we ſhall diſcover in them ſtill more ſigns of life. In a ſhort time the buds will grow large, will open, and produce their precious bloſſoms. We have it always in our power to obſerve this revolution regularly in the beginning of each ſpring; but perhaps have been hitherto ignorant by what means it operates. The effects we obſerve in ſpring, in trees, and other vegetables, are produced by the ſap, which is put in motion in the ſtalks of the trees, by the air and increaſe of heat. As the life of animals depends on the circulation of their blood, ſo alſo the life and growth of plants and trees depend on the circulation of ſap. For this purpoſe, God has formed and diſpoſed all parts of

vegetables, ſo as to concur towards the preparation, preſervation, and circulation of this nouriſhing juice. It is chiefly by means of the bark, that the ſap in ſpring riſes from the roots into the bodies of trees; and even conveys throughout the year, all the nouriſhment to the branches and fruit. The wood of the tree is compoſed of ſmall long fibres, which extend in a direct line the whole length of the tree to the top; and which are very cloſely joined together. Among thoſe fibres there are ſome ſo ſmall and fine, that one of them, though ſcarce as thick as a hair, contains more than eight thouſand little fibres. There are a multitude of little veins to contain the nouriſhing juice, and to make the circulation eaſy. Theſe veins extend to the other branches, and riſe up the whole length of the tree to the top; ſome conduct the ſap from the root to the top of the tree, and others bring it down from the top to the bottom. The ſap riſes up the aſcending veins in the heat of the day, and comes down the others again in the cool of the evening. The leaves ſerve for the ſame purpoſe, and their chief uſe is to make the ſap circulate; not only that which proceeds from the root, but alſo what the tree receives outwardly by means of dew, the moiſture of the air, and rain. This nouriſhing juice is ſpread through every part of the tree. But it could not riſe through the ſtalks, if there were not openings in them at the top. It is through theſe pores that the watery parts of the ſap evaporate, while the oily, ſulphureous, and earthly parts mix together to nouriſh the tree, to transform into a ſubſtance, and give it a new growth. If the juice does not reach it, if the circulation is ſtopped, if the interior organization of the tree is deſtroyed, whether by too ſevere cold or froſt, by age, or by any wound or outward accident, the tree dies.

After

After these reflections, can we see with the same indifference as formerly, the trees at the season of spring? Will the change there is going to be in them appear so little worth our notice? And, can we observe the renewal of all nature, without thinking of Him who gives life to every creature; who provides the juices analagous to trees; who communicates to that sap the power of circulating through the veins, and from thence of giving to trees life, nourishment, and growth: alas! that it should be possible to see all these things every year, without giving proper attention to them: it is what I am too strong a proof of. At the return of many springs, I have had the opportunity to observe this quickening virtue which appears in plants and trees; but I have thought no more about it than the animals which graze in the fields; and, what is still more wonderful, I have been equally inattentive to the preservation of my own life, the growth of my body, and the circulation of my blood. Grant that I may now, at least, as I have the happiness to see the spring again, think in a more reasonable way, and more as a Christian. May thou, O Lord of all mercy, incline my heart to acknowledge and glorify thy great and holy name. Now, that all nature revives, grant that my soul may be quickened by thy spirit. May this new existence, which the vegetables receive at this lovely season, be the signal to awaken me from my slumber, and lead me to virtue.

LESSON XXXVI.

OUR IGNORANCE OF OUR FUTURE STATE.

IF we are ignorant of future events, we must not seek the cause of it merely in the nature of our souls, the faculties and knowledge of which

are very limited; but alſo in the expreſs and infinitely wiſe will of the Creator. He knew the ſtrength of man, and he would not give him more knowledge than he could bear.

Knowledge is to the ſoul what the light of the ſun is to the eyes: a too great ſplendor would hurt, without being of uſe. It would be very dangerous to the virtue of man, if he had the faculty of foreſeeing what was to happen to him; for outward circumſtances have generally ſome influence on the way of thinking, and in the reſolutions we form: therefore, the more we know of future events, or the more temptations we ſhould have to ſurmount, the more we ſhould have to fear for our virtue. How wretched alſo ſhould we be, if we could ſee into futurity. Suppoſe, in reality, that the future events were to be agreeable and happy: while we do not foreſee this greater happineſs which awaits us, we enjoy with gratitude the preſent advantages we poſſeſs. But draw the curtain, and diſcover an agreeable proſpect of futurity, and we ceaſe from that moment to enjoy the preſent. We ſhould no longer be content, happy, or grateful. We ſhould anxiouſly and impatiently expect the fortune deſigned us; and our days would paſs one after another without enjoying them. But ſuppoſe future events are to be ſad and melancholy, we ſuffer before-hand all the afflictions as ſoon as we foreſee them. Days which might have paſſed agreeably, in peace and quiet, if the future had been concealed from us, are, as ſoon as we know it, ſpent in anxiety, in ſorrow, and in the ſad expectation of a certain evil. In a word, the idea of the miſfortunes reſerved for us, would prevent our enjoying preſent happineſs, and would make us inſenſible to it. How great, therefore, is the wiſdom and goodneſs of the Almighty, in having thrown a veil over futurity, and only letting us know our fate by degrees,

degrees, as the deſtined events happen to us! Let us never wiſh to anticipate the happineſs which awaits us, nor to feel the weight of evils before they happen. Let us, on the contrary, every time we think on futurity, bleſs our Creator for having, by this ignorance, ſpared us ſo many cares, fears, and ſorrows. Why ſhould we wiſh to ſee through the veil which covers futurity? If we are certain of our reconciliation with our God and Redeemer, we may alſo be certain, that all future events, be they agreeable or otherwiſe, will infallibly contribute to our real welfare.—And is it not a merciful and gracious Being who directs all events, and who rules futurity? He ſees at once the whole courſe of our lives, not only the paſt, but even what is to come, as far as eternity itſelf.—When we lie down to ſleep, let us recommend ourſelves to the care of our Heavenly Father, without troubling ourſelves about what may happen in the night; and when we awake, let us truſt in him, without being anxious for the events which may mark the day. In the midſt even of the dangers with which we are ſurrounded, and the misfortunes which threaten us, let us remember the goodneſs of God; let us put our truſt in him, and never doubt, that he will either remove them, or turn them to our advantage. —And though we do not know what evils await us, we need have no anxiety on that account, becauſe we know that God is not ignorant of them; and that, when they happen, he will not fail to ſupport and aſſiſt us. It is therefore to this wiſe and merciful Diſpoſer of all events that we ſhould, with entire confidence, truſt our fates.

LESSON XXXVII. TRIRTEENTH WEEK.

PATERNAL CARES OF PROVIDENCE FOR THE PRESERVATION OF OUR LIVES IN EVERY PART OF THE WORLD.

WE know at prefent a great part of our globe, and new regions of it are ftill difcovered from time to time. But no place has yet been found, where nature did not produce fome of the neceffaries of life. We know countries where the fun burns up almoft every thing; where little is to be feen but mountains and fandy deferts; where the earth is almoft entirely ftripped of the verdure with which it is fo richly adorned in our climates. There are countries which are fcarce ever cheered with the rays of the fun, and where its beneficent warmth is rarely felt; where an almoft continual winter benumbs every thing; where there is neither culture, fruit, nor harveft. And yet there are men and animals there, who do not fail of fubfiftence. The productions denied them by Providence, becaufe they would have been burnt by the fun, or frozen by the fevere cold, are fupplied by gifts more fuitable to thofe climates, and on which men and animals can feed. The inhabitants feek with care what nature has in ftore for them. They know how to appropriate it to their own ufe: and they thus procure for themfelves all they require for their fubfiftence and convenience of life. In Lapland, Providence has fo contrived, that an evil, in fome refpects very inconvenient to the inhabitants, becomes a means of their prefervation. They have an innumerable multitude of gnats, who, by their ftings, are a plague to the Laplanders, and from which they cannot guard themfelves, but by keeping up in their cottages a continual thick fmoke, and

and daubing their faces with pitch and tar. These insects lay their eggs on the water, and by that means draw a great number of aquatic birds who feed on them; and being afterwards taken by the Laplanders, become themselves the chief food of those people. The Greenlanders generally prefer animal food to the vegetable; and it is true there are very few vegetables in that barren country. There are however some plants in it, which the inhabitants make great use of; for example, sorrel, angelica, and particularly the spoon herb, cochlearia. But their chief food is the fish which they call angmarset. After they have dried it in the open air upon the rocks, it serves them every day instead of bread or greens; and they preserve it for winter in great leathern sacks. In Iceland, where there is no agriculture, owing to the severe cold, the people live on dried fish, instead of bread. The Dalecarians, who inhabit the north of Sweden, having no wheat, make bread of the bark of birch and pine, and a certain root which grows in marshes. The inhabitants of Kamschatka feed on the stalk or trunk of the bear's-foot plant, which they eat raw, after they have peeled it. In Siberia, they make much use of the roots of mountain-lily.

Adorable Father of all mankind! such are the tender mercies of thy providence for our preservation. With what goodness hast thou spread over the whole earth that which is requisite for our subsistence! Thy wisdom saw, before the foundation of the world, the dangers to which the lives of mortals would be exposed, and ordained that we should every where find sufficient food. Such a relation, connexion, and communication was formed by thy decree, between the inhabitants of the earth, that people separated from one another by vast seas,

ſeas, labour, notwithſtanding, for their mutual eaſe and ſubſiſtence.

LESSON XXXVIII.

ABUSE OF ANIMALS.

SO improper an uſe is made of animals, and in ſo many ways, that it would be difficult to enumerate them. Theſe abuſes, however, may be confined to two chief points; that of too much, or two little value being ſet on them; and, in either caſe, we act contrary to the intention of the Creator. On one hand, we lower the brutes too much, when we aſſume an unlimited power over them, and think we have a right to treat them according to our caprice. All who are not corrupted by paſſions, or bad habits, are naturally inclined to compaſſion towards every being that has life and feeling. This diſpoſition undoubtedly does honour to man, and is ſo deeply engraved on our minds, that any one, who had rooted it out, would prove to what a degree he was degraded and fallen from the dignity of his nature. He would have but one ſtep more to make (to refuſe to man the compaſſion he does not grant to beaſts) and he would then be a monſter. Experience but too well juſtifies this remark, and many examples of it may be recollected. Hiſtory furniſhes us with them. Thoſe nations, where the people took pleaſure in bull-baiting, diſtinguiſhed themſelves in cruelty towards their fellow-creatures. So true it is, that our treatment of beaſts has an influence on our moral characters; and on the gentleneſs of our manners. It may be ſaid, that we have a right to deſtroy hurtful animals.—I confeſs it: but does it follow from thence, that we are authoriſed to take

take from them, without pity or regret, a life which is ſo dear to every creature; and that, when neceſſity forces us to it, we ſhould find a barbarous pleaſure in it, or think we have a right, in thus depriving them of life, to make them ſuffer torments, often more cruel than death itſelf? I grant that the Creator has given us the animals for our uſe and pleaſure, and that they are deſigned, by their labour, to ſpare ours. But, does it follow, that we muſt unneceſſarily fatigue them, exhauſt them with labour beyond their ſtrength, refuſe them ſuſtenance merited by their ſervices; in fine, aggravate their ſufferings by ſevere treatment? But no more need to be ſaid, in regard to this kind of abuſe.

Men fall ſometimes into the other extreme, by ſetting too high a value on animals. Thoſe of a ſocial character, which are more connected with us, which live in our houſes, which amuſe, or are uſeful to us, inſpire us often with an extravagant and ridiculous affection. I am almoſt aſhamed to ſay, there are men and women extravagant enough to love thoſe creatures to ſuch a degree, as to ſacrifice to them, without ſcruple, the eſſential duties they owe to their fellow-creatures. Parents, and all who have the charge of children's education, or who live with them, cannot be too attentive to avoid ſcrupulouſly themſelves any abuſe of animals. It is the more neceſſary to dwell on this maxim, becauſe in general it is much neglected; and very bad examples of this kind are given to children, which ſometimes have an influence upon their whole education. No beaſt ought to be killed in their ſight: much leſs ſhould they be employed to do it. Let them be taught to treat animals, as beings which have life and feeling, and towards whom we have duties to fulfil. But, on the other hand, take great care that children do not attach themſelves

ſelves too much to animals, or grow paſſionately fond of them, as they are apt to do. In guarding carefully againſt children's making a bad uſe of animals, either way, they ſhould alſo be taught to make a good uſe of them, that they may, from their earlieſt age, be accuſtomed to acknowledge, even in thoſe creatures, an impreſſion of the perfections of the Creator.

LESSON XXXIX.

REFLECTIONS ON THE SEEDS OF PLANTS.

THE vegetable kingdom, to an attentive obſerver of the works of God, is a ſchool where he learns the profound wiſdom, and unlimited power of that Supreme Being. Though we were to live an hundred years upon earth, and could devote every day to the particular ſtudy of one plant, there would ſtill remain, at the end of that time, many things we either did not obſerve, or were not capable of perceiving.—Let us reflect on the production of plants: let us examine their interior conſtruction, and the formation of their ſeveral parts: let us conſider the ſimplicity and variety of them, from the blade of graſs to the higheſt oak: let us try to learn the manner in which they grow, in which they increaſe, in which they are preſerved, and the different uſes they are of to men and animals. Each of theſe articles will ſufficiently employ the mind, and make us ſenſible of the infinite power, wiſdom, and goodneſs of the Creator. We ſhall every where diſcover with admiration, the moſt aſtoniſhing order, and the moſt excellent deſign. Though we were to know no more of plants, than thoſe phenomena viſible to every eye; though we were only to know that

that a grain of corn ſown in the ground, ſhoots firſt a root down into the earth, and then ſhoots upwards a ſtem, which bears bloſſoms, branches, leaves, and fruit; and wherein are contained the ſeeds of new plants: this alone would be ſufficient to prove the wiſdom of the Creator. Let us conſider for once, with attention, all the changes which a grain of wheat goes through: we ſow it in the ground at a certain time, that is all we can do. But what are the operations of nature, after we have thus left it to itſelf? As ſoon as the earth ſupplies it with ſufficient moiſture, it ſwells and burſts open the outer coat, which had till then concealed in it the root, the ſtalk, and the leaves. The root pierces through, and ſinks deep into the earth; and prepares nouriſhment for the ſtem, which makes efforts to riſe even with the earth. When it has arrived at this, it grows by degrees till it has attained its proper height. It opens its leaves, which at firſt are white, then yellow, and at laſt tinged with green.—As ſoon as the outer ſkin is burſt, and the root has ſhot into the earth, the ſtem ventures to ſpring up in the form of a very ſlender ſtalk; yet, weak as it appears, it is already ſtrong enough to bear the intemperance of the ſeaſons. By degrees it grows up, and becomes an ear of corn, the ſight of which is ſo pleaſing to mankind.—The wheat is encloſed with leaves, which ſerve as a coat for it till it is ſtrong enough to break through them, and is armed with points to defend it from the birds.

The fields of corn ought naturally to make us remember thoſe fields where God lays up another ſeed. The human bodies depoſited in the earth, are as ſeed ſown, whoſe deſtination is to grow, and ripen for the harveſt of eternity. We had as little reaſon, on looking at a grain of wheat, to expect it to produce an ear of corn (though the

eſſential

eſſential parts of it were in the grain) as we have to believe that our bodies, reduced to duſt, will one day become glorified bodies.

The time will come, when the ſeed will burſt forth. My duſt will be raiſed again, and I ſhall live through Jeſus Chriſt. My body muſt decay and turn to duſt, but I ſhall not be eternally in the grave. My ſoul ſhall reſt, after the labours of this life in the boſom of my God. The eye hath not ſeen, neither hath the ear heard, any thing on earth equal to ſuch ſalvation.

LESSON XL. FOURTEENTH WEEK.

USE AND NECESSITY OF AIR.

AIR is the element to which all this lower world owes its life, beauty, and preſervation. All the changes we obſerve in the different beings our globe contains, depend on air. It is abſolutely neceſſary for the preſervation of animals; for moſt of them would die in half a minute, if they were deprived of it; and the others could not ſupport the want of it above two days at moſt. Not only terreſtrial creatures, and thoſe which fill the air, require that element, but it is abſolutely neceſſary alſo to the inhabitants of the water; and what is more, they require a change of freſh air as much as other animals. The birds, in order to fly, muſt be ſupported by the air; for which reaſon their lungs have openings, through which the air they breathe paſſes into the cavity of their bodies. This ſingle circumſtance diſcovers to us a profound ſagacity; for the body of the bird being filled, and in a manner ſwelled by the air, becomes lighter, and more fit for flying.

Plants,

Plants, even, in order to vegetate and grow, require air, and have therefore a multitude of little veſſels, which ſerve to draw it in, and by means of which, even the ſmalleſt particles of them, are provided with all the neceſſary juices.—Nothing would be more eaſy, than to multiply proofs of the neceſſity of air. Let us dwell on one ſingle circumſtance only, which demonſtrates it very clearly. If there was no air, there would be no twilight before ſun-riſe. It would come ſuddenly above the horizon; would appear the ſame as it does towards the middle of its courſe, and would not vary its appearance till the inſtant it would vaniſh entirely from our ſight. The ſun, indeed, would ſtrike our eyes with a bright light if there was no air; but it would reſemble a great fire burning in an open country in the middle of the night. It would in ſome ſort be day, as the ſun and the objects immediately ſurrounding us would be viſible to us; but all the rays that would fall on any bodies, at a certain diſtance, would reflect in a direct line, and be loſt in the extent of the heavens. Therefore, while the ſun would be placed directly over our heads, we might ſtill be in a ſort of night, if there was no air between that globe and us. Let us draw together all the advantages that air is of to our earth.—It is of uſe to the life and breathing of living beings; to the motion of winged animals, and thoſe which ſwim in water; to the propagation of ſounds: to hold the earth in equilibrium with the other globes; to the formation of vapours, rain, and winds. How neceſſary is it alſo to make the earth fruitful, to favour the vegetation of plants, and diſperſe the bad vapours which exhale from different bodies! The ſun could not furniſh us with either heat or light enough, if our globe was not ſurrounded with air. Nobody could be heard, if the air did not ſet the organs of

of ſpeech in play; if it did not tranſmits ſounds, and act on the organs of hearing. How innumerable, then, in all reſpects, are the advantages which the air and winds procure to mankind? If we accuſtom ourſelves to contemplate, with an attentive mind, the great object of the creation, we ſhall be naturally led to extol the works and the bleſſings of God. What may often make us neglect this duty, is perhaps our caſting but a ſuperficial glance over his works; and, in enjoying his bleſſings, our hearts have not always been ſenſible how little we deſerve them.

LESSON XLI.

DIFFERENT SOILS OF THE EARTH.

THE ſoil is not the ſame every where. The upper ſtrata is generally formed of a black moveable rich earth, which being moiſtened by broken remains of plants and animal ſubſtances, becomes the nutritive ſupport of millions of vegetables which enrich our globe. But even that ſtrata varies in quality. It is ſometimes ſandy and light, ſometimes clayey and heavy, and ſometimes moiſt, ſometimes dry, ſometimes warmer, and ſometimes colder. This is the reaſon why ſome herbs and plants grow naturally in certain countries, and require art and culture in others. The variety of ſoil alſo makes vegetables of the ſame kind differ in quality, according to the ground where they have been planted. In this inſtance, we again diſcover the wiſdom of our Creator. If all ſoils were alike, if all were of the ſame quality, we ſhould be deprived of many vegetables; becauſe each ſpecies requires a ſoil analogous to its nature: ſome require a dry ſoil, ſome a moiſt one; ſome require heat,

heat, others a colder ſoil; ſome grow in the ſhade, others in the ſun; ſeveral grow in mountains, and many more in valleys. From thence it happens, that each country has a certain number of plants peculiar to it, and which do not grow in equal perfection in others. Let the alder be tranſplanted into a ſandy ſoil, and a willow into a rich and dry earth, and it will be found, that thoſe ſoils are not fit for theſe trees, and that it will agree with them better to plant the former near marſhes, and the latter on the borders of rivers.—Therefore our Creator has provided for each ſpecies, by allotting to them the ſoil analogous to their internal conſtitution. It is true, that art can ſometimes force nature to produce according to pleaſure: but it is ſeldom worth the trouble; and, in the end, nature is found to have much the advantage of all the reſearches and labours of art.

The ſame variety that is obſerved in the ſoil of our globe, is found in the characters of mankind. There are ſome whoſe hearts are ſo hardened, that they cannot profit by inſtruction. No motive can influence; no truth, however evident, can rouſe them from their indolence.—This character may be compared to a ſtony ground, which no climate, nor the moſt careful cultivation, can render fruitful. A character almoſt as worthleſs, is that where levity predominates: perſons of this ſort, it is true, receive the ſalutary impreſſions of religion and piety, but are diſcouraged by the leaſt obſtacle that comes in their way; and their zeal vaniſhes as eaſily as their good reſolutions. In the minds of trifling, timid, weak people, truth and virtue cannot take root, becauſe there is no depth. They reſemble light and dry ſoils, where nothing comes to maturity, and where every thing dries up, as ſoon as the heat of the ſun is felt; becauſe they do not ſupply the plant with the nouriſhing juices

it requires. But how happy thofe characters with whom, as in a good foil, the feeds of piety ripen and produce an abundant harveft of good fruit. On thefe feveral difpofitions obferved among men, depends more or lefs the effect the word of God has upon the heart. In vain the fower fows the beft feeds, if the foil has not the fuitable qualities; all his care is in vain. The purity and goodnefs of the feed cannot fupply the natural defects of the foil. For when it is fo hard and clofe that the feed cannot enter, or fo fandy that it cannot take root, or fo full of ftones that it is choaked up, it is impoffible it fhould produce fruit.

To which of thefe do I belong? Perhaps my heart is not fo hard as to refift every impreffion. O Lord! make me like the fruitful foil, ready to fulfil the duties of life. And, in order to bear fruit in abundance, make me fruitful in good works, preferving the gifts of thy grace in an upright heart.

LESSON XLII.

SIZE OF OUR GLOBE.

IT is not as eafy as we imagine to be certain of the fize of our earth. There is indeed but one longitude, yet there are two latitudes, north and fouth. Both begin at the equator. The one extends toward the north, and the other toward the fouth, as far as the poles, either artic or antartic. But no one has yet been able to go as far as either pole, becaufe the mountains of ice in Greenland, and in the northern feas, have always obftructed the paffage. However, thanks to the geometricians, we at prefent know nearly the fize of our globe; and, according to the moft exact calculations, the furface of the earth is nine millions two hundred thoufand

thouſand and eighty ſquare leagues. The water occupies two thirds of that ſpace; ſo that what remains for terra firma or land is reduced to three millions and ninety ſix thouſand ſquare leagues.

It has been calculated, that there may be at leaſt three thouſand millions of men upon the earth; but in reality, there are not more than one thouſand and fourſcore millions; of which there are,

In Aſia 650 millions; in Africa 150 millions; in America 150 millions; in Europe 130 millions. If, then, we ſuppoſe the earth is inhabited by one thouſand millions of men, or thereabouts, and that thirty-three years make a generation, it follows, that in that ſpace of time there dies one thouſand millions.

This calculation muſt neceſſarily ſtrike us. If the mortality is ſo great every year, and even every hour, is it not probable that he who reflects on it, may himſelf be one of thoſe which ſwell the liſt of the dead? It is at leaſt certain, that it ought to lead us often to ſerious reflections. Now, at this moment, one of our fellow-creatures is going out of the world; and before this hour be paſſed, more than three thouſand ſouls will have entered into eternity. What a motive for thinking often and ſeriouſly on death.

Prodigiouſly great as the earth appears, its greatneſs vaniſhes at once, when we compare this globe to the other worlds which roll over our heads. The earth is then, in compariſon of the whole univerſe, what a grain of ſand is to the higheſt mountain.

But how does this thought exalt thee in our eyes; how inexpreſſible and infinite does thy greatneſs appear, O thou Creator of heaven and earth! The world and all its inhabitants are before thee as a drop in the ocean, or as the light atoms which float in the air. And what am I, among theſe

thouſand

thouſand millions of inhabitants of the earth! What am I before thee, thou Immenſe, Infinite, and Eternal Being.

LESSON XLIII. FIFTEENTH WEEK.

PRODUCTION OF BIRDS.

AT this ſeaſon of the year, there is a revolution in nature which certainly claims our attention. It is the time the birds lay, and hatch their young. This annual miracle paſſes in a manner before our eyes; and that it is really a wonder, which cannot be too much admired, the following reflections will convince us.—In each fruitful egg, which has not yet been ſat on, there is a ſpot (about the ſize of a freckle) viſible in the yolk. In the centre of this ſpot, there is a white circle, like a thin partition, which extends a little towards the top, and appears to join to ſome ſmall bladders there. In the middle of this circle, there is a kind of fluid matter, wherein the embryo of the chick is ſeen to float. It is compoſed of two lines or white threads, which appear ſometimes to be ſeparated from one another at their extremity; and between which a lead coloured fluid is perceptible. The extremity of the embryo is contained in a little bag, ſurrounded by a pretty large ligament; and it is there that the navel afterwards ſhews itſelf. This ligament is compoſed partly of a ſolid yellowiſh ſubſtance, and partly of a fluid dark ſubſtance, which is alſo ſurrounded by a white circle. This is what has been obſerved in the egg before it is ſat upon. After it has been above twelve hours under the hen, there appears in the linaments of the embryo, which is in the middle of the little ſpot, a moiſture that has the form of a little

a little head, on which are ſeen little veſicles, that afterwards become the back bones. In thirty hours the naval appears covered with a multitude of little veſſels. The eyes alſo are then diſtinguiſhable. The two white threads, which, in reuniting, have ſtill left ſome ſpace between them, encloſe five little bags, which are the brainy ſubſtance, and the ſpinal marrow, which goes through to its extremity. The heart is then viſible: but it has not yet been diſcovered, whether it is the heart or the blood that is firſt formed. Be that as it may, it is certain that the embryo of the chick exiſted before in the egg; and that, after it has been ſome time ſat upon, they diſtinguiſh the back bones, the brain, the ſpinal marrow, the wings, and part of the fleſh, before either the heart, or the blood and veſſels are perceptible. When the eſſential parts of the chick are thus formed, it continues to take new growth till the twentieth or twenty-firſt day, when it is able to break of itſelf the ſhell which had contained it.

We owe theſe diſcoveries to ſome great naturaliſts, who with the aſſiſtance of microſcopes, have obſerved, almoſt from hour to hour, the progreſs of the formation and the hatching of the chick. However, notwithanding all that we have drawn from their obſervations, there ſtill remain many myſteries, which may never be diſcovered to us. How does the embryo come into the egg? and who gave it the faculty of receiving, by means of warmth (for that is all the hen communicates to it) a new life and being? What is it that puts the eſſential parts of the chick in motion? and what is that vivifying ſpirit, which, through the ſhell, penetrates even to the heart, and occaſions its pulſation? How do birds know that their young are contained in the egg? What engages them to ſit on the neſt all the time neceſſary to hatch them?

Queſtions theſe are which cannot be anſwered in a ſatisfactory manner. But the little we know of the production of birds is ſufficient to prove the wiſdom of the Creator.

LESSON XLIV.

PERMANENCY OF CORPOREAL BEINGS.

NOTHING in nature periſhes; and, from the beginning of the world to the preſent moment, there has not been a grain of ſand, not an atom annihilated. The firſt foreſts, which the powerful word of God produced, were adorned with an innumerable multitude of leaves. Thoſe fell, withered, corrupted, and ceaſed to be leaves; but the parts which compoſed them ſtill remain. They have been converted into duſt, mud, or earth; but they are not annihilated. The matter of which the firſt leaves and herbs were formed, ſubſiſts ſtill at this day, and has loſt nothing of its eſſential parts. The plants which now flouriſh will exiſt, as to their parts, as long as the world ſhall laſt. The wood we burn ceaſes indeed to be wood, but its parts do not ceaſe to exiſt. They are diſperſed into aſhes, ſoot, and ſmoke, but they are not annihilated. The kingdom of nature is liable to continual change; all diſſolves, and all regenerates, but nothing finally periſhes. Let us not judge by appearances. When there happens any revolution, any diſorder, in nature, we are apt to believe that many things are totally deſtroyed: it is an error.—They are only differently modified, and become materials for the compoſition of other beings. The water which riſes in vapours does not periſh; it decreaſes in one place to increaſe in another. What uninformed perſons conſider as total

total deſtruction, is, in reality, but a mere change of parts; and, the world, conſidered in the whole, is juſt now what it was the firſt day of the creation, although a multiplicity of parts which compoſe it, have gradually undergone very conſiderable alterations.

This leads me to reflect on my own body, and the change it will experience in the grave. It is true, it will entirely corrupt, but it will not be annihilated, and the eſſential parts which compoſe it will always ſubſiſt. The perſuaſion of this truth is ſufficient to guard me againſt the fear of the grave and corruption, and, at the ſame time, to confirm the hope of a reſurrection in my ſoul. Why then ſhould my heart be troubled, why ſhudder at the thought of the grave? That which will be ſhut up there, it is not me; it is my earthly habitation. I myſelf cannot be deſtroyed. All my members are numbered, and will be preſerved. What I have been, I ſhall be hereafter; and I ſhall live for ever and ever.

The continual duration of corporeal beings may lead me to conclude, with much probability, that my ſoul alſo will be immortal. Since none of the earthly parts will be annihilated, is it to be preſumed that my ſoul ſhould be the only created thing that is to be deſtroyed? No. The whole corporeal world would ſooner periſh than one ſoul redeemed by Jeſus Chriſt.

LESSON XLV.

PLEASING EFFECT OF THE HEAT OF THE SUN.

AT the approach of ſpring, nature gradually recovers the life ſhe ſeemed to have loſt in winter. The earth is clothed with verdure. The trees are covered with bloſſoms. On all ſides are

ſeen new generations of inſects, and other animals, coming out rejoicing in their exiſtence, and endowed with a thouſand different inſtincts. Every thing is animated. Every thing revives. And this new life, which appears in the nobleſt parts of nature, is produced by the return of warmth, which awakens animals and plants, and puts their renewed ſtrength in motion. We owe this admirable revolution to the ſun, which is the ſource of life, ſenſation, and joy, as its ſalutary and enlivening rays are ſpread over all nature. The ſeeds feel its effect, and open in the boſom of the earth. It is from thence that the plants and vegetables ſhoot, ſpring up, and grow. Its approach revives and ſtrengthens animals. Every living creature that has breath or feeling, vegetation alſo, feels the benign influence of that majeſtic globe. How would it be, if we were deprived of the light and heat of the ſun? How melancholy would the face of the earth appear, if an uninhabitable deſert? Into what a lifeleſs ſtate would moſt creatures fall, and how wretched and languid would ſuch exiſtence be? What a ſource of joy and gladneſs would the heart of man be deprived of, if he could not enjoy the rays of the riſing ſun, or the light of a ſerene day! Nothing would compenſate for the loſs of it. The mildeſt night, the gentleſt artificial warmth, could not ſupply the place of that vivifying virtue, which the light of the ſun communicates to every being, and which has a ſalutary effect, very different from that of earthly fire. Men and animals know and feel it. A valetudinarian ſhut up warm in his room, with every poſſible aſſiſtance, will not gain as much ſtrength in many weeks, as he would in a very ſhort time from the warmth of the ſun in the fine weather of ſpring. Plants forced in hot-beds, never gain ſuch a degree of ſtrength and conſiſtence as thoſe which grow in the ſun. In the

the latter, every thing combines for the perfection of plants and animals; whereas in artificial heat, we ſee nothing but the weak and languiſhing efforts of an inneffectual ſubſtitute. But would the ſun exiſt, and could it communicate light and heat to us, if the Creator of all things, had not formed it, and given it the power of ſhedding over the whole earth its quickening virtue? It is from the Lord we receive all the bleſſings which are derived from the ſun. It is he who created it, who rules its courſe, and who preſerves its light and ſplendor. Each morn he cauſeth it to appear again, and in each ſeaſon makes us feel its happy effects. Without him, there would be neither ſun, nor light, nor heat, nor ſpring. Let us then raiſe our ſouls to him, to the Creator of the ſun. Its beneficent warmth, its beautiful and clear light, leads to him, the Being of beings, the Source of every bleſſing, the Father of light.—The Pagans were too blind to acknowledge God as author of the ſun. They ſtopped at the effects, without knowing the cauſe. But we know there would be no ſun, if he did not exiſt; that it would neither give light nor heat, if not ordained by God. We know that vegetation, increaſe, growth, all the bleſſings which ſurround us, all our agreeable ſenſations, all that charms or delights us, proceed from him. The ſun is but the inſtrument of his goodneſs, the miniſter of his will, the herald of his greatneſs.

LESSON XLVI. SIXTEENTH WEEK.

RELATION THAT ALL CREATURES HAVE WITH ONE ANOTHER.

THE prodigious number of creatures there are upon the earth is, in itſelf, well worthy our admiration; but what muſt ſtill more ſtrike us, is

the proportion between all thefe, and the wife chain which links this infinite multitude of different beings in fuch a manner, that they form but one regular and perfect whole. The extent of the animal creation is incomprehenfible, and yet all of them find food fufficient. No fpecies, however few there are of them; no individuals, however perfecuted they may be, are ever extinct. It is true, that many ferve as food to others, but the number of beafts of prey is not confiderable. Moft of them are folitary, and do not much multiply. Thofe even that are pretty numerous, are content with little food, and cannot obtain it without much art and trouble. Several of them have enemies which prevent them from multiplying too faft; or elfe the weak and timid animals fupply in number what they want in ftrength, and efcape their perfecutors by all forts of ftratagems and cunning. The mineral kingdom ferves for the prefervation of the animal, and they both tend to the good and benefit of mankind. The moft ufeful plants, fuch as corn, grow every where, multiply the eafieft, and are the leaft liable to fpoil. The animals which are moft neceffary to mankind are fcattered every where in abundance. The productions of the different climates are fuited to the particular wants of mankind. Thus, the hotteft countries abound in cooling fruits. In countries liable to a great drought, there are plants and trees, which are, in a manner, fprings of water, and which provide enough to quench the thirft of men and animals. Where wood is wanting, there is a great quantity of peat and turf found. If there are countries deprived of rain, and other fources of fertility, they are made amends for it by fruitful inundations, like that of the Nile in Egypt. In civil fociety, talents and bleffings are fo admirably diftributed, that, as each individual may be happy, according to his circumftances, fo there is nothing,

that

that is neceſſary, wanting to ſociety in general. If the inclinations and diſpoſitions of men were not ſo varied; if their taſtes and tempers did not make them embrace different kinds of life; if there was not ſo much variety in their genius, their way of thinking, in their beauty, riches, and other outward circumſtances, human ſociety would ſoon become a melancholy deſert. There is no rank of men who can do without others. Each country has its peculiar advantages; and, if they were common to all, there would be neither connection nor commerce between men. In a word, on whatever ſide we caſt our eyes under heaven, we every where find the moſt admirable harmony and proportion. Notwithſtanding the infinite variety of creatures, and the continual interruption of many of the laws of nature, it appears, that in this immenſe univerſe, all is perfect, all is planned and contrived for the general good, all is in the moſt regular and exact order. On whatever ſide I caſt my eyes, I ſee nothing but the wiſeſt and moſt delightful harmony. It ſhines on all ſides. It embelliſhes every thing. Nothing is unconnected. Every thing combines to the ſame end. The whole is linked together with wonderful art, and all the parts declare the power and wiſdom of the great Creator.

LESSON XLVII.

THE PRODUCTION AND INCREASE OF PLANTS.

IN general, vegetables ſpring from ſeed, and in moſt plants it is the flower or bloſſom which produces the ſeed, and makes it fruitful. Almoſt all flowers are folded up in a bud, where they form themſelves ſecretly, and are guarded by their coat, and outſide leaves. Then, when ſap flows in abundance, particularly towards ſpring, the bloſ-

ſom grows large, the bud opens, the coat falls off, and the flower appears. In the middle of the flower, there is a thread or a little pillar called *piſtil*, which riſes pretty high, particularly in tulips. Round the piſtil are the *ſtamina*, with heads at the top of them, containing duſt of different colours; which being ſcattered by the wind over the flower, makes the ſeed perfect.

Vegetables increaſe alſo by ingrafting. From a tender branch of a tree, when in ſap, they take an eye, or a beginning of a branch, with a part of the bark, and they graft it into another tree; that is to ſay, they inſert this eye between the bark and the wood, after which they gently tie up the whole, by rolling worſted two or three times round it. From that eye there comes a branch, which is of the ſame ſpecies as the tree from whence the eye was taken, though the tree into which it is inſerted (and which is called *wild-ſtock)* ſhould be quite another ſort. Trees and other woody plants are alſo perpetuated by ſlips. From a willow, for example, they take a ſlip, that is to ſay, a ſingle ſtick or branch, and put it in the ground, after having cut off the little branches, that it may not in the beginning take too much ſap. Roots ſoon ſhoot out of it in the places where it had beginnings of branches, and it becomes a tree.

Laſtly, vegetables alſo increaſe by roots; but theſe muſt have eyes, or they will not ſhoot. Certain plants caſt all around them trains or long ſtrings, which have knots or eyes in them. The knots lengthen their fibres in the ground, and become ſo many new feet, which may be ſeparated from each other, to make ſo many more plants. The root even is a ſort of eye, in which the plant is encloſed; and it has between its leaves little eyes, ſo that it may alſo be renewed by the leaves, when the little eyes or roots remain faſtened to them.

What

What a train of caufes muft operate to produce vegetables, to preferve and renew them. Suppofing even that the feed pre-exifted, what art does it not require to open them, to give growth to the plant, to preferve and continue the fpecies? The earth muft be a fruitful mother, in whofe bofom plants may be placed and nourifhed conveniently. Water, which contributes alfo to the nourifhment of plants, although in a lefs degree, muft be compofed of all thofe parts which are beft calculated to make them fhoot and grow. The fun muft put all the elements in motion, and by its heat make the feed fpring up, and ripen the fruit. It was neceffary to form a juft balance and proportion between the plants, in order that they fhould neither multiply too faft, nor be too few in number. It was neceffary, that the texture, the veffels, the fibres, and every part of the plant fhould be fo difpofed, that the fap, the nourifhing juice, fhould penetrate into it, circulate, digeft, and prepare itfelf in fuch a manner, that the plant fhould receive the proper form, fize, and ftrength. It was neceffary to fix exactly what plants were to fpring up of themfelves, and what were to require the care and culture of men.

In all this I acknowledge thy wifdom and goodnefs, O adorable Creator! Every fpring thou reneweft the face of nature, and crowneft the year with thy bleffings. Let the earth, as well as the heavens, declare the glory of thy great name, now and for evermore.

LESSON XLVIII.

FLOWERS OF THE MONTH OF APRIL.

THE nearer we approach that charming month, which prefents to us the country, the fields, and gardens in full beauty, the more we fee the

wild and melancholy appearance of nature wear off. Each day brings forth ſome new creation. Each day nature draws nearer to perfection. Already the graſs begins to ſhoot, and the ſheep run eagerly to feed. The corn begins to appear in the meadows, and the gardens become cheerful and pleaſant. Some flowers ſhew themſelves here and there, and invite the floriſt to obſerve them. The ſweet and modeſt violet is one of the firſt productions of ſpring; its ſmell is ſo much the more agreeable, as we have been ſo long deprived of thoſe delightful perfumes. The beautiful hyacinth riſes inſenſibly in the midſt of its leaves, and ſhews its little flowers, which equally delight the ſight and ſmell. The Imperial crown-flower caſts around it a multitude of ſtarry leaves; its ſtalk riſes high, and its red and yellow bloſſom, ſhaped like a bell, and inclining towards the earth, forms a ſort of crown, with a tuft of leaves at the top. From the midſt of its leaves the auricula raiſes its flower, which imitates the richneſs of ſatin and velvet; its elegant form and ſweet perfume make amends for its want of ſtature. The tulip comes out more ſlowly; it does not yet venture to open, becauſe the night air, or cold rains, might ſpoil the beauty of its colours. The ranunculus, the pink, and the roſe, do not blow till milder days allow them to appear in full beauty. An attentive obſerver will find in this many reaſons to admire the wiſdom and goodneſs of his Creator. It is for very wiſe purpoſes, that at the return of ſpring, each plant begins preciſely in the time and the order preſcribed to it, to open its leaves and bloſſoms, and to prepare every thing for the production of its fruits. There is a conſtant ſucceſſion of vegetables from the beginning to the end of the year. Some are ſcarce-viſible, when others prepare to appear; and thoſe are followed by ſeveral hundreds of others, which

which ſpring up each in its turn, and at the appointed time. Whilſt the fruit of one plant is ripening, nature prompts another to propagate, that its fruit may be ready by the time the former has fulfilled its deſtination. Thus nature continually offers us an agreeable ſucceſſion of flowers and fruit. She leaves no void; and, from one end of the year to the other, ſhe watches over the ſucceſſive generations of plants. But why has not our Creator given us the enjoyment of more plants at a time? The reaſon of it is evident. For how would it be, if all the flowers and fruit came at the ſame time? Would there not be ſeaſons entirely without vegetables? Should we not be deprived of the pleaſure which thoſe agreeable and progreſſive changes procure us, by preventing the diſguſt inſeparable from a ſameneſs? How many plants would periſh, if they were now expoſed to the cold nights which are ſometimes felt even in ſpring? Would ſo many millions of animals and inſects find ſubſiſtence, if all the plants bloſſomed and bore fruit at the ſame time? The beneficent Creator has thus provided for our maintenance and pleaſure. Thoſe two views could only be fulfilled, by ordaining that nature ſhould not produce all the vegetables at the ſame time, but ſucceſſively, and by degrees.

Let the lovely and ſprightly youth conſider and behold in theſe flowers the image of themſelves. They alſo are placed in a fertile ſoil, and have many charms for which they are beloved.—Obſerve how ſoon the violet, the auricula, and the hyacinth fade, when the north wind blows upon them. Young man, think of the fate that threatens youth, and be not vain of the flower of thy youth. Life is like unto graſs; it flouriſhes as the flower of the field. "As ſoon as the wind goeth over it, "it is gone, and the place thereof ſhall know it "no more."

LESSON

LESSON XLIX. SEVENTEENTH WEEK.

THE RETURN OF THE BIRDS.

A SMALL number of birds paſs the winter with us. Whole families have gone out of our countries. Some ſought milder climates than ours; others found warm retreats in caves, in hollow ground, and other ſuch places. By degrees thoſe birds return to us. The mild air in ſpring awakens the ſwallow from its benumbed ſtate; and a ſecret inſtinct brings back into their own countries, the birds who, laſt autumn, undertook a long paſſage beyond the ſeas, in ſearch of ſubſiſtence, and of the climate their conſtitution required. Their return is uſually in this order, that thoſe who went earlieſt return ſooneſt. The air will be peopled again with winged ſongſters. The groves will reſound with the harmonious notes of the nightingale. The ſwallow will return to the neſt it had built the winter before. The ſtork will find again the very houſe it left at the beginning of the winter. In a few weeks, the air will reſound again with the ſongs of birds, and their return will fill the plains and the valleys with joy and gladneſs.

Two things particularly are remarkable in this emigration of birds. The firſt is, that they know exactly the time when they ought to return. "The "ſtork in the heavens knoweth her appointed "time; and the turtle, and the crane, and the "ſwallow, obſerve the time of their coming." Undoubtedly the temperature of the air, in reſpect to heat and cold, and the natural inclination of thoſe creatures to bring up their young, are their greateſt motives for changing their place: but it is, in other reſpects, a very extraordinary inſtinct, and

and in ſome degree inexplicable. It is no leſs wonderful, that thoſe animals, void of reaſon, know ſo exactly the way they are to go, and how far it is. Without compaſs or guide, without proviſion, and in the moſt regular order, they undertake and finiſh a journey of ſometimes more than 200 miles. Who then has taught them to follow a certain road in an element ſo inconſtant as the air? Who informs them how far they are gone, and how far they have yet to go! Who is it that guides, feeds, and furniſhes them with all neceſſaries for their journey? Do not thoſe animals do what men themſelves would be unable to do? To undertake journeys of ſuch a length, what experience, what aſſiſtance, what directions and preparations we require? Can we even, with the aſſiſtance of our reaſon, with a compaſs and geographical maps, follow ſo invariably the road over ſeas and mountains, as the birds do without aſſiſtance? In whatever light we conſider this, we may plainly diſcover a power ſuperior to the mere inſtinct of animals. We muſt acknowledge, that an Almighty Power has impreſſed this inſtinct on the mind of the birds, which they ſo regularly follow.

LESSON L.

PLEASURES WHICH THE CONTEMPLATION OF NATURE AFFORDS.

NATURE offers to all her children, with maternal goodneſs, the firſt, the moſt innocent, the leaſt expenſive, and moſt univerſal of all pleaſures. It is that which our firſt parents enjoyed in paradiſe; and it is only the fallen ſtate of man which makes him ſeek other pleaſures.

Men

Men are apt to deſpiſe the daily bleſſings they enjoy, however excellent; and they only think of multiplying and varying their amuſements. It is certain however, that the pleaſure I ſpeak of, is preferable to all others. It is almoſt impoſſible not to find charms in the contemplation of nature. And that it may be enjoyed without expence is manifeſt; the poor as well as the rich may indulge it. But that is what leſſens the value of it. We are ſo fooliſh as not to prize what others ſhare with us; while, if we were reaſonable, nothing ſhould give more value to a bleſſing, than the thought that it makes the happineſs of our fellow-creatures as well as our own. In compariſon of this pleaſure, ſo noble and ſenſible, how trifling and vain are thoſe far-fetched magnificent amuſements, which the rich obtain with ſo much trouble and expence, which leave a certain void in the ſoul, always ending in diſguſt. Whereas, nature, rich and beneficent, preſents us continually with new objects. Pleaſures, which are only the work of our own imagination, are of ſhort duration, and vaniſh like a dream, the charms and illuſions of which are loſt at the moment of waking. But the pleaſure of reaſon, and of the heart, thoſe we enjoy in contemplating the works of God, are ſolid and laſting, becauſe they open to us an inexhauſtible ſource of new delights. The ſtarry ſky, the earth enamelled with flowers, the melodious ſongs of the birds, the various landſcapes and proſpects, every one delightful, may continually furniſh us with new ſubjects of ſatisfaction. If we are inſenſible to theſe, it is certainly our own fault; it is becauſe we behold the works of nature with an inattentive and indifferent eye. The duty of a Chriſtian conſiſts in enjoying innocently all that ſurrounds him. He knows how to draw reſources from every thing, and has the art of being happy

under

under any circumſtances, at little expence, and without danger to his virtue.

Lord, teach us thyſelf, to know and to feel thy power and goodneſs. For, it is only in ſtudying to find thee in all thy works, that we can open to ourſelves an inexhauſtible and pure ſource of delight. We ſhall then have a fore-taſte of that fulneſs of joy, which we ſhall experience in thy preſence for evermore.

LESSON LI.

ANIMALS ARE CAUSES FOR MAN TO GLORIFY GOD.

IT is not ſufficient not to treat creatures improperly; we ought alſo to endeavour to make the beſt uſe poſſible of them. How then can that be, but by making them ſerve to glorify God! This all creatures do, but particularly the animated beings. In every plant, tree, flower, or ſtone, the greatneſs and glory of the Creator are viſibly imprinted, but it appears with ſtill more luſtre in the animal creation. Examine the conſtruction of one only of thoſe animated beings. What art, what beauty, what admirable wiſdom ſhall we find, and how will theſe wonders multiply, if we think of the almoſt infinite number and aſtoniſhing variety of animals! From the elephant to the mite (which is only viſible through a miſcroſcope) all is harmony! And if, at firſt ſight, we think we diſcover any imperfection in certain things, we ſoon find it is only our ignorance, which has led us to form a wrong judgment. It is not neceſſary that every individual ſhould make deep reſearches on this ſubject. It is not neceſſary to be a learned naturaliſt. It is enough to attend to the moſt familiar

liar and the beſt known things before our eyes. We ſee, for example, a multitude of animals, all admirably formed; who all live, and feel, and move, as we do; who are, like us, liable to hunger, thirſt, and cold, and conſequently, require, as we do, that their wants ſhould be ſupplied. To all thoſe creatures God has given life; he preſerves, he gives them what is neceſſary, and takes care of them, as a father of a family does of thoſe that compoſe his houſehold. Shall we not from thence conclude, that he has the goodneſs, the tenderneſs of a father? Shall we not alſo conclude, that we ought to love that Being, who is mercy itſelf? If the care of the Creator extends to animals, what will he not do for us? If he makes it his ſtudy to render the lives of thoſe creatures happy and eaſy, what may we not expect from his beneficence! Let the cautious fearful man then bluſh at his anxieties; he, who, as ſoon as he finds himſelf not in affluence, falls into apprehenſions and fears that the Almighty will let him periſh for want. Let us indulge another reflection upon the inſtinct of beaſts, and take occaſion from it to admire and adore that Great Being, who ſo wiſely combines the means with the end. As the inſtinct of animals all tend to their preſervation, this appears moſt evidently in the love and care the beaſts have for their young. Our Lord himſelf, to expreſs the moſt parental cares, makes uſe of the image of a hen gathering her chickens under her wings. It is indeed a moſt affecting ſight to behold the natural and ſtrong affection the hen has for her young ones, and the conſtant care ſhe takes of them. She ſeldom takes her eyes off them. She runs to their aſſiſtance at the approach of the leaſt danger. She flies at the aggreſſor with courage. She hazards her own life to ſave that of her chickens. She calls them, and encourages them

them by her maternal voice. She ſpreads out her wings to receive and conceal them. She neglects all ſorts of convenience to herſelf; and, in the moſt uneaſy poſture, ſhe ſtudies the ſafety and welfare of the objects of her affection. Who does not here acknowledge the hand of the Moſt High! Without the maternal care of the hen; without that inſtinct ſo ſtrong, and ſo ſuperior to every thing, the chickens, the whole ſpecies would infallibly periſh. Can it be ſaid, that what the hen does for her young is done with underſtanding and reflection, that ſhe judges, reaſons, foreſees, combines, and draws conſequences? Certainly not. And though, at firſt ſight, every thing really ſeems to proceed from the tenderneſs and underſtanding of the bird; yet we muſt acknowledge in it a ſuperior hand, which ſhews itſelf, without our knowing in what manner it acts. I think theſe two examples are ſufficient for the purpoſe. Therefore, without enlarging more upon it, I ſhall content myſelf with concluding in a few words, that it is the duty of man, to ſeek in the animals an occaſion to glorify God; that it is an indiſpenſable duty, which ought to be ſacred to him, and is equally agreeable and uſeful.

LESSON LII. EIGHTEENTH WEEK.

REFLECTIONS ON THE BLOSSOMS OF TREES.

AT the time in which our gardens and fields are adorned with all the ornaments of ſpring, all Europe appears with equal pomp, and every where preſents the moſt cheerful proſpect. The power of the firſt word pronounced by the Creator, when he formed the world, produced all theſe magnificent effects. The Creator and Monarch of the world,

world, has in a few days renewed, and in a manner created the earth again, for the uſe and pleaſure of his intelligent creatures. Come, O man! come and try what thy wiſdom and power can do. Art thou able to make a ſingle tree bloſſom, to order a ſingle tulip to appear in all its beauty, or call from the earth the ſmalleſt blade of graſs? Draw near, ye learned artiſts, and ſkilful painters! Contemplate theſe flowers, examine them with the moſt ſcrupulous attention; is any thing wanting to their perfection? Do you find any fault in the mixing of the colours, in their form or proportion? Could your pencil expreſs the dazzling red of the peach bloſſom; Could you imitate the fine enamel, the uniformity and ſimplicity with which a cherry-tree in bloſſom is adorned? But why do I ſay, imitate? Are you even capable of feeling all the magnificence of renewed nature, or of forming to yourſelves a juſt idea of its inimitable art? If there were no ſtronger proofs on earth of the power and wiſdom of God, the flowers of ſpring alone would be ſufficient to convince us of it. Each tree that bloſſoms, each herb and flower proclaims his goodneſs and wiſdom, which is over all the earth. We remark an infinite variety in the bloſſoms of trees. All are beautiful; but their beauties are different. One ſurpaſſes another; but there are none which has not ſomething pleaſing peculiar to itſelf. However great the Creator in the diſpenſing his gifts, he ſtill reſerves to himſelf the liberty of beſtowing more on ſome than others. But this difference is only in reſpect to acceſſary qualities. Such a tree, for example, has bloſſoms of a dazzling white; another has red ſtripes and ſhades, which the firſt wants: ſome have, added to the beauty of their form and colour, an exquiſite perfume; all theſe differences do not in the leaſt affect their fertility. Thus, though we have

have not the ſame advantages as appear in ſome of our fellow-creatures, it ought not to afflict or diſturb us; for the loſs of any accidental beauty, of whatever nature it may be, does not hurt our real welfare. Let our chief ſtudy be, to act in ſuch a manner, that when the beauty and charms of the body are no more, we may ſupply their place with abundant fruits of virtue and piety.

LESSON LIII.

THE DAWN OF DAY.

THE morning dawn diſcovers to the world a new and magnificent creation. The ſhades of night deprive us of the ſight and enjoyment of the earth and ſky. But when the light of day returns, we behold all nature renewed and embelliſhed. On a ſudden we ſee the earth arrayed in all its magnificence; the mountains crowned with foreſts; the hillocks clothed with vines; the fields covered with their harveſts; and the meadows watered with rivulets. The horizon glows; the clouds are all tinged with variety of the livelieſt colours; cheerful flowery vales are diſcovered at a diſtance; light vapours ariſe and change to gold; and the dew-drops that fall on the flowers take the mild luſtre of pearls. By degrees, as the light increaſes, the ſpectacle becomes more magnificent. We go from light to light, till at laſt nature preſents us with her moſt glorious object. The ſun riſes; and the firſt ray that eſcapes over the mountain which had concealed it from us, darts rapidly from one end of the horizon to the other. More rays follow, and ſtrengthen the firſt. By degrees the diſk of the ſun appears, and at length ſhews itſelf entire; then advances and runs its courſe, with

with a majeſty which the human eye can no longer ſupport. O Lord! who art Father of the whole creation, the joy and gladneſs of all nature, the animation of every being, invites me alſo to raiſe my ſoul towards thee with the moſt lively tranſports of gratitude and joy. At the moment, when thee ſun is darting his firſt rays upon the earth, millions of creatures praiſe and adore thee. Can I then be ſtill inſenſible to all theſe wonders! From thee proceeds each beauty of the morning dawn; thou art the very ſource of light. If thou didſt not exiſt, there would be neither ſun, nor dawn, nor creation.

But are not thoſe indolent men much to be pitied, who never gave themſelves the heavenly pleaſure of contemplating the riſing ſun? O, if they were but rational enough to indulge in the pure and delighful enjoyment which this magnificent object of nature is ſo calculated to inſpire! If they could but feel, that the ſight of beautiful nature muſt naturally fill the heart with pious delight, and profound veneration for the Creator! If they could, in fine, comprehend, that one ſingle thought, which riſes in the ſoul on ſeeing the dawn of day, may become the happy beginning of a Chriſtian life, would it not be worth giving up ſome hours of ſleep for it?

LESSON LIV.

THE SPRINGING UP OF SEEDS.

THERE are, at this ſeaſon, many changes making before our eyes in the vegetable kingdom, but there are ſtill many more which eſcape our ſight, and which nature does in ſecret. The ſeed ſome time ago ſowed in the ground, ſwells, increaſes,

increaſes, and the plant by degrees ſhoots up and grows. This mechaniſm deſerves ſo much the more attention, as it is, properly ſpeaking, the ſource of all the beauties which ſpring and ſummer preſent us with in the vegetable kingdom. The ſeed is compoſed of different parts, according to the different ſpecies; but the chief is the germ. Each ſhoot has two parts; the one ſimple, which becomes the root; the other ſcaly, which riſes and becomes the ſtalk and head of the plant. The ſeed of moſt plants is compoſed of two pieces which are called lobes, that are filled with a meally ſubſtance. Moſſes have the moſt ſimple ſeed of any. It conſiſts only in the ſhoot, without pellicles or lobes. A certain degree of moiſture and warmth are abſolutely neceſſary to make the ſeeds ſpring up. The increaſe of heat, and the difference obſervable in the taſte and ſmell, ſeem to diſcover here a ſort of fermentation. By means of this preparation the meally ſuſtance of the lobes becomes proper to nouriſh the tender ſhoot. It is known by experiments, which have been tried with coloured juices, that this ſubſtance ſucks in a moiſture, which furniſhes a proper nouriſhment, with the aſſiſtance of air, and of heat, till the plant has acquired conſiſtence enough to profit by the juices which the root procures for it. Then the exhauſted lobes dry by degrees, and at the end of a few weeks, fall off, when the plant no longer requires them. Certain herbs, which grow on mountains, are of a very particular nature. As their duration is ſhort, it would often happen that the ſeed would not have time to ripen. In order, therefore, that the ſpecies ſhould not periſh, the bud, whi h contains the ſhoot, is formed at the top of the plant, puts out leaves, falls, and takes root. But when the plant comes out of the earth, it would run too great a riſk, if it was once expoſed

to

to the outward air and the power of the ſun. Its parts, therefore, remain folded, and laid one upon another, nearly as it was in the ſeed. But, by degrees, as the root ſtrengthens, and ſtretches on all ſides, it furniſhes the upper veſſels with abundance of juice, by means of which all the organs ſoon unfold themſelves. The plant is, at firſt, almoſt gelatinous, but it gradually acquires more conſiſtence, and is always increaſing.

This abridgment of the hiſtory of the ſhooting of plants is ſufficient to ſhew us, how many preparations and means nature makes uſe of, to produce one ſingle little plant. When, therefore, we ſee a ſeed ſpring up, which we have ſowed, we muſt not imagine (as is uſually the caſe) that it is not worth our attention. It is one of thoſe wonders of nature, which is a ſubject of reflection for the greateſt men. At the ſight of this phenomenon, let us ſilently admire the power and wiſdom of that God, who is adorable in all things.

LESSON LV. NINETEENTH WEEK.

ON THE BUDS OF FLOWERS.

ON all ſides I diſcover a multitude of flowers in the bud. They are at preſent enveloped and cloſely ſhut up in their intrenchments. All their beauties are hidden, and their charms are veiled. Such is the wretched miſer who lives by himſelf, who centers all in himſelf, and whoſe views are mean and ſelfiſh; who makes his own private advantage or pleaſure the only object of his deſires, and the narrow motive of his actions. But ſoon the penetrating rays of the ſun will open the buds of the flowers, and will deliver them from their ſilken bonds, that they may blow magni-

ficently

ficently in our ſight. What delightful perfumes will they exhale! Thus, alſo, may the moſt ſordid miſer become beneficent when his ſoul is enlightened by grace. To a heart of ſtone may ſucceed a feeling and compaſſionate one; a heart ſuſceptible of the ſweeteſt and tendereſt emotions. By the mild influence of the Sun of Righteouſneſs, the ſocial affections diſcover themſelves, and open more and more. Senſibility no longer centers in one object; it becomes univerſal; it takes in all mankind; it extends its generous cares, and all that is within its reach is benefited by it. When I reflect on the buds and bloſſoms, I think of you, O lovely youth of both ſexes! The beauty and power of your minds are not yet unfolded. Your faculties are ſtill in a great meaſure concealed. The hope which your parents and maſters conceive of you will not ſo ſoon be realized. When you conſider theſe buds, ſay to yourſelves, I reſemble that bud; my parents and maſters expect from me the unfolding of my talents and faculties; they do every thing for me; they neglect nothing for my information and inſtruction; they watch moſt tenderly over my education; to the end that I may become (firſt by bloſſoms, and afterwards by excellent fruit) their joy and comfort, and make myſelf uſeful to ſociety. I will therefore do all in my power to fulfil the pleaſing hopes they form. I will take advantage of all the improvement and inſtruction they give me, in order to become every day wiſer, better, and more amiable. For this purpoſe, I will take care not to give way to the deſires and paſſions of youth, which might be fatal to my innocence, and deſtroy all the hopes conceived of me.

LESSON

LESSON LVI.

INDEFATIGABLE LABOURS OF THE BEE.

IT is one of the advantages of ſpring, that it furniſhes us with an opportunity of obſerving the induſtry and labours of the bee.—Certainly a bee-hive is one of the fineſt ſights a lover of nature can ever have. We are in a continual ſtate of ſurpriſe on ſeeing their order and regularity; and particularly in thoſe magazines ſo plentifully furniſhed with all that is neceſſary for the ſubſiſtence of the ſociety in winter. What merits our attention more than all the reſt is, the indefatigable application and uninterrupted labours of this little republic. The bees give us an example of induſtry and activity, which is not only uncommon, but perhaps has not its equal. They appear as ſoon as winter is over, even when it might ſtill be feared, that the cold would hurt them, and benumb their delicate limbs. When the juices of the flowers which begin to blow have not yet been ſufficiently digeſted by the ſun, ſo as to furniſh honey in plenty, the bees ſtill gather ſome little for their food. But their cares and activity redouble very evidently during ſpring and ſummer. In the building their cells they are ſo indefatigable, that we are aſſured, that a honey-comb of double cells, back to back, ſuch as three thouſand bees can lodge in, is diſpatched in twenty-four hours. This whole work is divided amongſt the members of the republic. While ſome of the bees are gathering the wax, preparing it, and filling the magazines, others are employed in different works. Some take the wax, and make uſe of it to build their cells; others knead it, poliſh, and purify it; others gather the honey from the flowers, and lay it in the hive for their

their daily ſubſiſtence, and for future occaſions. Others cloſe with a covering of wax, the cells in which they keep their winter proviſion of honey. Some carry food to their young, and cloſe with wax the cells of the little ones, that are near the time of transformation, to prevent their being diſturbed in working their way out. Some cloſely ſtop up, with a ſort of bird-lime, all the chinks and holes in the hive; and cover all the weak places, that neither the wind nor little inſects may find entrance. Some drag out of the hive dead bodies, which might infect them; or, if theſe dead bodies are too heavy to be carried away, they cover them over with bird-lime or wax, and cement them in ſuch a manner, that, in corrupting under that cruſt, they cannot occaſion any bad ſmell. But, it is not enough to admire the activity of theſe little creatures; it ought to give us emulation, and ſerve us as a model, conſidering the proportion between us. We have many more motives for diligence than thoſe inſects. We have an immortal ſoul of ineſtimable value. With what application ought we to labour for its happineſs, and to avoid what might lead to its total ruin! What is more calculated to excite us to activity and indefatigable diligence, than the conſidering, that the fruit of our labours does not merely extend to a few days and years, but to eternity itſelf? The bee gathers honey not only for herſelf, but for her ſuperiors; whereas, in applying ourſelves to wiſdom, we labour for ourſelves, and we gather fruits for everlaſting life. Let us, therefore, never be ſlothful or idle in doing good; but let us acquit ourſelves of the duties of life with zeal and fidelity.

LESSON LVII.

THE ZOOPHITES.

THE zoophites, or animal plants, are nothing but insects; though by their outward form, their immobility, and their manner of increasing by buds, and seeds, they are very like real plants. These animals, as well as plants, can be multiplied by slips, and by ingrafting. Their animal nature only shews itself, by the sensibility and voluntary motion observed in them. Most of the zoophites hold by a sort of root to the sea or the waters they live in. Some inhabit stoney and chalky places; others are surrounded with a shell, more like horn; and lastly, some are entirely soft and fleshy. They increase by a sort of bud, which contains a young animal, which grows some time with the stalk, which at last falls off, and becomes a complete animal.—Should one ever have supposed, that there were animals whose form was so like plants, and to spring up like them? Could one form an idea of an animal, that could be ingrafted like a plum-tree, turned inside out like a glove, and produce its young as a stalk shoots its branches? It is not fifty years, since any man, who would have hazarded such ideas, must have passed for a madman. And yet it is now incontestible, that there are such animals, who not only by their outward form, but also by their manner of being perpetuated, resemble plants. By this discovery, made in the first half of the present century, natural history has gained a great deal. It may even be said, that it has enlarged our ideas; and since the discovery of animal plants, it is almost impossible to determine exactly, where the animal kingdom ends, and where the vegetable begins. It

It is generally believed, that the difference between plants and animals consists in the former having neither sensibility nor motion, and the latter having both. That is then the distinguishing character between plants and animals; but how faint the shade, how slight and almost imperceptible the line, which separates the two kingdoms, when we think of the discovery of the zoophites! The several species of creatures rise, grow to perfection, and approach one another so nearly, that the limits which separate them can no longer be distinguished. Throughout all nature, we see something of infinity, as the peculiar characteristic of its great Author.

LESSON LVIII. TWENTIETH WEEK.

THE PLEASURE OF CULTIVATING FIELDS AND GARDENS.

THE culture of fields and gardens is one of the most agreeable employments, and perhaps the only one that is compensated by a thousand pleasures for the trouble it gives. Most works confine men to a room or shop, but he who devotes himself to country pursuits is in the open air, and breathes freely upon the magnificent theatre of nature. The blue sky is his canopy, and the earth enamelled with flowers is his carpet. The air he breathes is not corrupted by the poisonous vapours of cities. A thousand agreeable objects present themselves to his sight, and, if he has any taste for the beauties of nature, he can never want pure and real pleasures. In the morning, soon as day-break again opens the brilliant scene of the creation, he hastens to enjoy it in his field or garden. The dawn proclaims the near approach of the sun. The

graſs ſprings up again revived, and its points ſhine with dew-drops, brilliant as diamonds. Delightful perfumes, exhaled from herbs and flowers, refreſh him on every ſide. The air reſounds with the ſongs of birds, expreſſive of their joys, and their happineſs. Their concerts are hymns of praiſe to the Creator, whoſe bleſſings they feel, in the agreeable light and heat of the ſun, the reliſh of their food, their alacrity and joy.

Would it be poſſible, at the ſight and ſenſe of ſo many pleaſing and affecting objects, that the heart ſhould not be touched with delight, with love, and gratitude towards our Creator. What contributes ſtill more, to render agriculture and gardening particularly agreeable, is the infinite variety of objects it affords, of works, and employment which attach us to it, by conſtantly affording new ones, and preventing the diſtaſte inſeparable from ſameneſs. Nature preſents the huſbandman with numberleſs agreeable changes. Sometimes he ſees the plants ſpringing out of the earth; others riſing high, and unfolding themſelves; others again in full bloom.

Come, all people, bleſs the Lord, and praiſe his works. He is the ſource of all good. He ſends the rain to water the barren field, and it is through him alone that the earth becomes fruitful.

LESSON LIX.

THE TULIP.

THE tulip is certainly a very beautiful flower; and, if we conſider that every year there blow millions of tulips, which all differ from each other, the proportion and beauties of which are infinitely varied, we muſt have loſt all feeling not

to

to be ſtruck with admiration. Certainly, to be convinced of the exiſtence of a wiſe and good God, we need only contemplate a tulip in full bloom. Therefore when we look at a bed of tulips, let us not limit ourſelves to the admiration of their beauty, but let us admire above all things, the infinite wiſdom of that Being who has formed theſe flowers, and executed them in ſuch perfection. Whatever charms the tulip has, it loſes a little of its value, in being merely food for the eye, and having no ſweet ſmell. For when we compare it with the carnation, which, joined to the beauty of its form, has the moſt exquiſite perfume, we ſoon forget the gaudy dreſs of the tulip. Such is the fate of perſons, who are endowed with beauty, and ſet off their charms with every ornament, but are deſtitute of the beauties of the mind. The former captivates but for a very ſhort time, while the beauty of the mind remains when all the charms of form are fled; and the eſteem which our virtues inſpire, is conſtant and durable. A virtuous ſoul is formed by the rules of wiſdom, and its ornament is innocence. The perfume of good works is ſpread around wherever it exiſts, and it will, one day, be tranſplanted into the garden of Paradiſe. One obſervation which the hiſtory of plants affords us, is, that the more beautiful a flower is, the ſooner it fades. In a ſhort time, nothing of that blooming tulip will remain but a withered ſtalk. Its life and beauty laſt but for a few weeks; age deſtroys its charms; its leaves fall; and its colour fade. What an uſeful leſſon is this for us. Let us remember how uncertain and frail is beauty, and reſt our hopes of diſtinction upon the more ſolid baſis of intellectual attainments.

LESSON LX.

THE LANGUAGE OF ANIMALS.

MAN, properly ſpeaking, is the only animal who can be ſaid to have language; and it is particularly by this circumſtance, that he ſhews his ſuperiority over all other animated beings. It is by means of ſpeech that he extends his empire over all nature; that he riſes towards his Divine Author; contemplates, adores, and obeys him. It is by this faculty, that he learns to know himſelf and all the creatures around him; and to make them ſerve for his uſe. Every animal but man is deprived of this faculty, becauſe they are void of reaſon; and it is reaſon which capacitates us to learn languages, and the uſe of ſpeech. But as animals make their wants and feelings known by natural ſigns; as they utter certain ſounds, which expreſs the ſentiments that affect them, one may ſo far allow they have a ſort of language. The variety of theſe tones, their number, their uſe, and the order in which they follow one another, form the eſſential parts of their language. To form a juſt idea of it, it is not neceſſary to have recourſe to deep reſearches: it is enough to obſerve the animals daily before our eyes, and with whom we have a ſort of intimate connection. Examine the hen with her chicks: if ſhe finds any food, ſhe calls and invites them to it. They underſtand her, and come inſtantly. If they have loſt ſight of this tender mother, their plaintive cries expreſs their anguiſh, and deſire to ſee her again. Attend to the different cries of the cock, when a ſtranger or a dog comes into the poultry yard, when a kite, or any other enemy appears, and when he calls or anſwers his hens. What do theſe lamentable cries of the turkey

turkey mean? See her chicks all on a ſudden concealing themſelves and lying ſo quiet, one would ſay they were dead. The mother looks up to the ſky, and her anxiety increaſes; but what is it ſhe ſees there? A black ſpeck, which we can ſcarce diſtinguiſh; and this ſpeck is a bird of prey, which could not eſcape the vigilant and piercing eyes of this mother. The bird of prey diſappears. The hen gives a ſcream of joy. Her anxiety is at an end. The chicks revive, and gather again happily about their mother. There is much variety in the language of the dog. Who can be inſenſible to the joy that this faithful ſervant ſhews at the return of his maſter. He jumps, he dances, he runs here and there, turns quick and lightly round his maſter, ſtops all at once; fixes his eyes on him with the greateſt tenderneſs; draws near him; and licks and careſſes him repeatedly. Then beginning his play again, he puts himſelf into all ſorts of attitudes; barks; tells every body how happy he is; and ſhews his joy many ways. But how different are theſe ſounds, from thoſe noiſes he makes at the ſound of a robber, or thoſe he makes on ſeeing a wolf. If we follow a dog in the chace, we ſee how he makes himſelf underſtood, by all his motions. How well adapted his ſigns are to the diſcoveries he wiſhes to make! This affords us an opportunity to admire the wiſdom and goodneſs of the Supreme Being. What beneficent attention he has ſhown towards animals, in granting them the power to expreſs by ſounds their wants and feelings! From their organization, and the nature of their ſouls, it was impoſſible they ſhould ſpeak the human language; but they would have been much more to be pitied, and leſs uſeful to us, if the Creator had entirely deprived them of the power of making themſelves underſtood. To compenſate them for the want of ſpeech,

he endowed them with the addreſs to communicate, by a thouſand little ways, their feelings to one another, as well as to mankind. He has given them organs, proper to produce and vary a certain number of ſounds; and their make is ſuch, that each ſpecies has particular and diſtinct ſounds, by which they make themſelves underſtood. In a word, the Creator has given as much force to the language of animals, as their nature would admit of; and all that the end for which they were created required. But as for us, we poſſeſs faculties in all reſpects much ſuperior. We can riſe to general notions, and ſeparate the object from the qualities which diſtinguiſh it. We can, by means of an infinity of ſounds (articulate and arbitrary) expreſs all our conceptions

O thou the Creator, what gratitude do we not therefore owe thee! Grant that we may never forget this important part of thy bleſſings; but, on the contrary, that each time we make uſe of ſpeech, we may reflect on the excellence of our privileges, and the greatneſs of thy wiſdom and goodneſs.

LESSON LXI. TWENTY-FIRST WEEK.

COMPLAINTS OF MANKIND, RELATIVE TO CERTAIN INCONVENIENCES IN THE LAWS OF NATURE.

"WHY is the human body, from its con-
"ſtitution, liable to many infirmities and
"accidents?" Whoever aſks this queſtion, let him ſay, if it is poſſible to form one's ſelf a body, which unites more advantages in itſelf, than that which we have received from our Creator? It was incompatible with nature, and the chain of things of this world, that man ſhould have an invulnerable body.

body. If one of our fellow-creatures is deformed; another lame; a third deaf or dumb; is it a reason to murmur against God? Are those defects so common as to give us reason to complain? If, after these questions, any one should still think they have reason for discontent, let them reflect on the following truths. It is of use to men, in general, that they may not want examples of the defects, to which the human body is liable. For, when a person, perfect and well made, compares himself with one that is crooked and deformed, he is sensible of all the advantages of well formed limbs; he learns to value properly a gift till then unthought of, and to take more care to preserve it. How valuable is each eye, each ear, each organ of sense, each joint, each limb, if we only observe the condition of the few people who are deprived of them!—Would any of us part with a limb, in exchange for the greatest treasure? Are not our bodies more beautiful and regular, than the finest building, or the most curious machine? And, though the latter are very inferior to it, we are far from attributing the assemblage of their parts to chance. "Why are the countries of the "earth so different from one another, some-"times cold, sometimes damp, sometimes low, "and sometimes high?" But, O man, if thou hadst the power to form a globe, wherein every thing was to be for the advantage of men and animals, would thy understanding furnish thee with a plan better than this? The countries of the earth, by means of their difference, produce variety of exhalations and winds, which occasion that mixed air, wherein, experience tells us, that men and animals live healthy and content in most places, and wherein plants also grow and increase. "It "is however allowed, that the variation in wea-"ther is not beneficial to all men, or to all coun-"tries." But, has not the preceding weather

influenced the following, as the climate of one country often influences another. Are we capable of judging of the whole? Muſt a number of farmers ſigh in vain for rain, becauſe dry weather would ſuit the private convenience of one family! A certain temperature of the air may occaſion, here and there, a tranſient barrenneſs; but, can it be called an evil, if it was neceſſary in order to hinder the air from corrupting? Is it reaſonable, when we cannot take in the whole, to find fault with a part? "Why are there ſo many hurtful "animals?" Would it then be better to have no beaſts of prey, ſmall or large upon the earth? They put a ſtop to the number of animals, that would otherwiſe overpower us; and, it is becauſe many animals ſerve for food to beaſts of prey, that the number of living creatures increaſes every year. If theſe beaſts of prey did not exiſt, the carcaſes of the animals on which they feed, would not only be uſeleſs to living creatures, but would be hurtful. Every year, animals thus devoured are replaced by others; and, in moſt caſes, population depends on the quantity of ſuſtenance. Thus gnats, and other inſects would ſoon want food, if the animals, whoſe prey they are, did not prevent them from multiplying too faſt. "Why has the "Creator regulated the courſe of nature by ſuch "invariable laws? It is in conſequence of ſuch regulations, that man's experience and labour enable him to make uſe of his underſtanding and powers; ſo as to be, in ſome meaſure, maſter of his own welfare. Would we wiſh to inhabit a world, where we ſhould have no occaſion to do any thing; where we could not in any way promote our own pleaſures; where there ſhould be no rule, no fundamental law; where, in fine, the beſt, the bad, and the worſt, being equally unknown, nothing could make us attend to the laws of nature?

Doubtleſs,

Doubtleſs, there will ever be a number of things in nature, the purpoſes of which, or their relation with the whole, muſt ever be concealed from us. But on all occaſions, let us reſt in this principle, that the Almighty does every thing for wiſe and beneficent purpoſes.

LESSON LXII.

THE HARMONY AND PATRIOTISM AMONG THE BEES.

UNION and patriotiſm form undoubtedly the fundamental happineſs, which may, in ſome meaſure, be aſcribed to bees. It is at leaſt certain, that their republic would ſoon be deſtroyed, if they did not live in great harmony amongſt themſelves. Thoſe who have made obſervations on this ſubject, inform us, that when the bees return to their hives, loaded with materials for building, they find ſome of their companions ready to relieve them from their burdens. The travellers begin their journeys again; and while they are gathering more proviſion, the working bees who remain in the hive, knead together the little the others had brought; and thus prepare a maſs proper for the building. Some, who are not directly employed in work, are buſy in doing good offices to thoſe that are; and bring them food, in order to let the work go on without their loſing by it. This harmony nearly approaches to the patriotiſm obſervable amongſt men. The riches of a nation are the riches of each citizen; and this numerous republic forms but one family. Here there is no ſelf-intereſt, no avarice, and conſequently no rapine. Here the bees never aſſemble together to uſe violence, and fight battles with their country people.

Here we never ſee one bee avariciouſly wiſhing for more than is neceſſary, whilſt another is in want: neither do they ever try to get more honey, when they have laid in a ſufficient proviſion for the winter.

Inſignificant as we reckon theſe inſects, we may learn from them virtues, on which depend the repoſe and happineſs of our lives! In whatever rank or condition we are, it is neceſſary to act in concert with our fellow-creatures. The ſociety in which we live, Chriſtianity, and our own happineſs require it. Let each of us cheerfully bear our part in the general burden: and, if it is neceſſary, let us even take upon us the burdens of others, when, through ignorance or weakneſs, any may be deficient. And if it ſhould ſo happen, that religion, duty, and conſcience, require us to make great ſacrifices to our fellow-creatures, let us take care not to conſider it as an evil, let no viſible ſelfiſhneſs ever find room in our hearts. Thoſe who ſeek to enrich themſelves, at the expence of others, are contemptible members of ſociety. When we can in any ways contribute to the general good, let us not be deterred from it, by the fear of having no reward: are not the teſtimony of a clear conſcience, and the bleſſings of eternity ſufficient rewards? It is too true, however, that among the evils of this life, which we form to ourſelves, we muſt reckon this one, that there is no ſuch thing as perfect agreement in ſentiments and characters: but, even this ought to make us admire the wiſdom of Providence, which, notwithſtanding the diſunions and diſorders of the world, notwithſtanding the ſelf-intereſt which governs mankind, ſtill keeps up ſociety and makes it flouriſh. When a pilot knows how to direct his ſhip, ſo as to avoid the ſand-banks, againſt which it may be caſt by the waves, it is then that I admire his ſkill and experience.

And

And when I ſee, notwithſtanding the wickedneſs of mankind, in the midſt of the ſtorms of paſſion, that wiſdom and virtue ſtill preſides, I admire the infinite wiſdom of him who governs the world.

LESSON LXIII.

THE PRODIGIOUS NUMBER OF PLANTS ON THE EARTH.

ABOVE twenty thouſand different ſorts of plants have been already reckoned, and we diſcover new ones every day. Some have been found out by the help of the microſcope, where they were leaſt expected. Moſſes and ſponges have been claſſed among vegetables, and have diſcovered to the virtuoſi flowers and ſeeds before unknown. Freeſtone is often covered with dark brown ſpots, and the ſame is ſeen on the beſt poliſhed glaſs. This mouldy ſubſtance ſticks to moſt bodies, and it is a garden in miniature, a field, or a foreſt, where plants have their ſeeds, which bloſſom viſibly, notwithſtanding their extreme littleneſs. If we reflect on the quantity of moſs, which covers even the hardeſt ſtones, and the moſt barren ſpots; on the quantity of herbs and graſs; on the ſeveral ſorts of flowers; on all the trees and buſhes, each of which may be conſidered as an aſſemblage of a thouſand different vegetables; if we add to theſe the aquatic plants, as ſlight and delicate as a hair, and moſt of which are ſtill unknown to us, we may, in ſome meaſure, form to ourſelves ſome idea of the multitude of plants upon our globe. It is more wonderful how all theſe different ſorts of plants are preſerved, without deſtroying one another. In order to prevent this, the Sovereign Diſpoſer of all things has appointed to each ſpecies of

of vegetables a place analogous to its peculiar qualities. He has diſtributed them upon the ſurface of the earth, with ſo much wiſdom and propriety, that no part of it is deſtitute, nor do they grow in too much abundance any where. This is the reaſon that ſome plants require growing in an open field, and not in the ſhade, where they would at leaſt grow languid and weak. Others can only ſubſiſt in water, where the different qualities of the fluid matter occaſions great variety. Some plants grow in ſand, others in marſhy and muddy places. Certain vegetables ſpring above the ſurface of the earth, others unfold themſelves within its boſom. The different ſtrata of which the ſoil is compoſed, ſand, clay, chalk, &c. have each their particular vegetables; and from thence it is, that in the immenſe garden of nature, there is no place abſolutely barren. From the ſmalleſt duſt to the hardeſt rock, from the torrid to the frigid zone, every ſoil, every climate, has its peculiar plants. Another circumſtance is well worthy our admiration; the Creator's having ſo ordained, that, among this great number of plants, thoſe uſed for food or medicine increaſe much more abundantly than thoſe of leſs uſe.

LESSON LXIV. TWENTY-SECOND WEEK.

PLURALITY OF WORLDS.

IT is not through ignorance alone, it is more through ſelf-love and pride, that we call nothing the world but one of the leaſt parts of the univerſe; perſuading ourſelves that our globe alone is peopled; that the ſun was made merely to communicate its light and heat to us, and that the moon and

and ſtars are of no other uſe but to light our nights, and ſhew the traveller his way. The contemplation of the fixed ſtars is ſufficient to contradict this ridiculous opinion. Their twinkling proves, that they ſhine with their own light; and their being viſible to us, at the immenſe diſtance they are from us, proves that they are much larger than the ſun. Is it then probable, that theſe celeſtial bodies, which are not luminous ſpecks, but great ſuns; theſe numberleſs bodies placed ſo far from our globe, that they ſhould not be created for better purpoſes? If the purpoſe of them were only to ſerve as nocturnal lights to us, they would be of no uſe the greateſt part of the year. The frequent cloudy ſkies, and the nights that are light from other cauſes, would make them uſeleſs. Thoſe ſtars alſo, which the naked eye cannot diſcover from their great diſtance, would be abſolutely of no uſe; and the purpoſe aſcribed to them would be better ſupplied by one ſingle ſtar nearer to us, than by ſo many millions at that diſtance. As the ſame reaſoning may be applied to all the uſes the ſtars are of to us, either in navigation or any thing elſe, it muſt be allowed, that we could not poſſibly account for the deſign of thoſe numerous ſuns, if no creatures except thoſe of our own globe profited by their light and heat. This concluſion appears ſtill more natural, if we reflect attentively on our ſolar ſyſtem. We obſerve that the moon in many things reſembles this earth; that there, as well as here, land and ſea, mountains and valleys, iſlands and gulphs, are to be ſeen. Such affinities as theſe authoriſe us to admit others, and to ſuppoſe alſo in the moon, minerals, plants, animals, and rational creatures. The analogy between the moon and the reſt of the planets leads us to form the ſame conjectures of them. And as each ſtar has, to all appearance, like our ſun, its particular planets, and

and as these undoubtedly resemble ours, we in a manner behold around us an innumerable multitude of worlds, each of which has its peculiar laws, arrangement, productions, and inhabitants. How numerous are the works of God! How glorious the starry sky! How great our Creator! Millions of worlds declare his glory, and the intelligent beings they contain acknowledge and adore their Maker. How forcibly does this incline us to join with the heavenly choir, in singing the praise of the Most High, that it may resound over all the universe! How happy the prospect that opens to us of that future state, wherein we shall be acquainted with these worlds, and able to comprehend the wonders of them!

LESSON LXV.

LEAVES OF TREES.

THE leaves of trees form one of the great beauties of nature. Our impatience to see them bud in spring, and our joy when they at last appear, prove sufficiently, that they are the ornaments of our gardens, fields, and woods. How great the pleasure we enjoy in the hot summer days, from the refreshing coolness of their delightful shade. Yet after all, this is certainly the least of the advantages, which accrue to us from the foliage of trees: we need only consider the wonderful construction of leaves to be convinced that they were designed for much more important purposes. Each leaf has certain vessels, which, being pressed close at the end, or in the stalk, extend themselves like ribs within the leaf, and branch out in a thousand ways. There are no leaves without these extreme fine vessels, and an astonishing number of pores. The

The nourifhment of plants proceeds directly from leaves; their pores ferve to fuck in the moifture, or the juices of the atmofphere, and to communicate them afterwards to the whole plant. By thefe means the plants in dry weather run no rifk of wanting nourifhment. They receive abundance of refrefhing dew, which, falling from the upper leaves, waters thofe under them, and thus none of this nourifhing juice is loft. And as plants perfpire greatly, as many experiments fhew us, the leaves appear to be the principal organs of this important perfpiration. They ferve alfo to introduce into the plant the air it requires. They even contribute to the prefervation of the bud, which is to fhoot the following year; for the eye of the bud is already under the leaf: undoubtedly it is guarded and preferved by them; at the fame time that the quantity of juice, where the leaf joins to the plant, alfo ferves to preferve it. This is the reafon, that many trees wither and die when their leaves are gathered: it fometimes happens to the mulberry tree, when it is ftripped without proper caution to feed filk-worms. This is alfo the reafon that grapes do not ripen, when the vine lofes its leaves in fummer. Another remark may be made on this fubject, which very much opens to us the manner of the plant's growth: the under fide of the leaves, always turned towards the ground, is generally of a paler and lefs bright colour; it is more rough and fpongy than the upper fide. Here again we difcover the wifeft purpofes: the fide of the leaf next the ground is rougher, and confequently more full of pores, in order to fuck in fo much the better what dew rifes from the earth, and to diftribute it afterwards over the reft of the plant in more abundance. The leaves then turn on the fide that can beft receive the nutritive moifture; and this is the reafon that leaves of fome plants incline very

very low down. If we obſerve trees growing on a ſteep hill, we ſhall ſee that their leaves do not take a horizontal direction, but evidently a perpendicular one; which proves that the leaves draw towards the ſide where there is moſt moiſture. Theſe reflections may make us conſider the leaves of the trees hereafter, in a different light from what we have hitherto done. If we did not know the inimitable art of their conſtruction, nor the important purpoſe of their exiſtence, it would not be wonderful, that we ſhould ſee them with neglect and indifference. But when we know that each leaf is an effect of the Divine Power, and an organ of fruitfulneſs, it would be unpardonable to ſee them with inattention. They ought naturally to lead us to the following uſeful reflections: every thing, even the very ſmalleſt object in nature, has been planned with wiſdom by the Creator.

LESSON LXVI.

THE REVIVING POWER OF THE SUN.

I MYSELF feel this beneficent power. As ſoon as the ſun riſes over my head, it fills my ſoul with ſerenity and joy. Its ſplendor and warmth inſpire me with ſpirit and activity, ſufficient to fulfil the duties of life, and to enjoy ſociety. The involuntary indolence and lowneſs, which made me inactive in winter, are by degrees vaniſhed. I breathe more freely, and I employ myſelf with more pleaſure. How can it be otherwiſe, when I am witneſs to the univerſal joy which the ſun communicates to the world, and every where perceive its enlivening powers? It animates and revives all creatures with its benign influence. Millions of ſhining inſects awake, ſport, and baſk in its rays.

rays. The birds ſalute it with their melody. Every thing that breathes rejoices in it, and we every where trace its happy effects. It cauſes the ſap to riſe and circulate through trees, plants, and vegetables. It cauſes the leaves and bloſſoms to ſhoot. It forms the fruit, then ripens it, and gives it colour. It ſheds life and light throughout all nature. It is the ſource of that warmth, without which every animal would languiſh and die. The effect of the ſun is not only felt on the ſurface of our globe, but even in caves under ground, where it produces metals, and alſo animates living creatures. It penetrates into the higheſt mountains, though they are compoſed of rocks and ſtones. It extends even to the bottom of the ocean, where it acts in ſeveral ways. When we reflect on theſe uſeful effects of the ſun, it is natural to think of the miſerable condition we ſhould be in, if we were deprived of the light and heat of that celeſtial body. Without it, what would our globe be, but a lifeleſs maſs, without order or beauty? The trees could not produce leaves, nor the plants flowers; the fields would be without verdure, and the country without harveſt; all nature would have a gloomy melancholy appearance.

The ſun with its reviving power, is the emblem of a truly charitable Chriſtian. He alſo ſpreads joy and bleſſings around him. By him the oppreſſed heart is raiſed and ſtrengthened, the afflicted are comforted, the ignorant are enlightened, and the poor relieved. Oh! let us hereafter reſemble this beneficent and charitable man. Let us, according to our different ſtations, ſhare with our fellow-creatures the goods which Providence has beſtowed upon us. Without partiality or prejudice, let us hold our aſſiſtance to all who want it. Let us inſtruct one, comfort another, feed the hungry, relieve the diſtreſſed. Thus ſhall we quit this world

world regretted and beloved, and our memories be bleſſed by our fellow-creatures.

LESSON LXVII. TWENTY-THIRD WEEK.

THE DESIRES OF THE SOUL ARE INFINITE.

LET us employ ſome moments in reflecting on ourſelves. The ſoul has certainly the firſt claim to our attention. It touches us nearly, and ought to be dearer to us, than all the pleaſing objects which this ſeaſon ſo particularly affords. Whatever ſatisfaction we find in contemplating the corporeal world, it cannot be compared to that which we experience, in reflecting upon the nature and faculties of the ſoul. The obſervation of exterior objects, ſuch as the traveller meets on the road, is certainly agreeable to him, becauſe he requires to be amuſed and refreſhed through his pilgrimage; but that of ſpiritual objects leads directly to the bleſſed immortality we may expect, as citizens of the world to come. Let us therefore ſometimes reflect on the deſires implanted in our ſouls by the Creator. Experience proves, that our thirſt of knowledge can never be fully gratified. We have no ſooner made one diſcovery than we aim at another. Our deſires are never ſatisfied; and when we at laſt obtain what we had moſt ardently wiſhed for, we begin again to form new deſires: that of acquiring more and more bleſſings accompanies us through life, and even in the moment of quitting the world. What concluſion can be drawn from this, but that, as our deſires continually extend beyond the preſent, without being ever fully gratified, there muſt be bleſſings after death, beyond the limits of this life? We are not then

then designed for this transient life alone, but for an everlasting one. Is it probable, indeed, that man would be the only creature on earth endowed with faculties, without having, at the same time, the destiny for which these faculties were bestowed upon him? That man should have an instinct, without the means of satisfying it, and be in this respect more miserable than brutes? When a beast is hungry or dry, it always finds means to supply its wants. We see the silk-worm spin its bag, and shut itself up for its transformation. Would that happen if it was not designed for another state, in which it was to appear again under a new form? We see that birds lay eggs: would that be the case, if these eggs were not to serve for the preservation of their species, or that of other creatures? If our existence, then, was to be confined within the narrow limits of this life, why should we have received inclinations and desires which cannot be gratified, and faculties which we could never use?

Being of Beings! Our souls are capable of being filled with thy Spirit; we may love thee above all things; we may aspire at being like thee, and united to thee for ever; we may be raised in this world above all earthly things, and soar even to thee. Is it then possible, that souls such as these should be annihilated? that we should have learned to know thee in vain? Undoubtedly, whatever we possess on earth, are but pledges and fore-runners of the infinite felicity which awaits us hereafter.

LESSON LXVIII.

THE USE OF VENEMOUS PLANTS AND ANIMALS.

EVERY thing on earth, considered separately, is good and wholesome; and, if any thing becomes hurtful, it is because we make a bad use of

of it, inſtead of that for which it was deſigned. From thence it is, that the ſort of food, which preſerves the life of one animal, deſtroys another; and that a plant which, in ſome caſes, is conſidered as poiſonous, is on other occaſions very uſeful and ſalutary. Thus, for example, hemlock was formerly ſuppoſed deadly poiſon, and now a number of experiments aſſure us, it makes admirable cures. The multitude and variety of vegetables which grow upon the earth is prodigious; but we muſt not imagine they were all created for the uſe of man. Some plants are deſigned for beaſts, others furniſh us with dreſs and ornaments; ſome pleaſe our taſte and ſmell, and a great number of them are medicinal. But the number of noxious plants and animals is nothing in compariſon of the multitude of thoſe that are of the greateſt uſe to us. The Creator has alſo implanted a natural inſtinct in men and animals, which gives them an averſion to whatever is hurtful to them. The miſchievous beaſts have a certain fear of man, and ſcarce ever make uſe of their offenſive arms, unleſs they are attacked or provoked. Beſides, the moſt noxious animals have evident marks and characters by which their dangerous properties are eaſily known; that, by being warned, we may avoid, or prevent the danger. The rattle-ſnake, which is the moſt venemous of all ſnakes, gives warning of its approach by the clattering of the rings in its tail. The crocodile is ſo heavy in its motions, and turns with ſuch difficulty, that it is very eaſy to eſcape from it. Divine Goodneſs has even ſo wiſely diſpoſed things, that the moſt dangerous and venemous animals furniſh the remedy with the poiſon. Thus the ſcorpion's oil is an infallible remedy for its venom. A bee bruiſed, rubbed, and put on the wound, cures the evil of its ſting. The fat of vipers is alſo an excellent remedy againſt their bite.

Several

Several creatures which appear hurtful are not really ſo, at leaſt in certain reſpects. Their poiſon, and even the organs they make uſe of to wound others, are abſolutely neceſſary to them. One example may ſerve for all the reſt: the bee often gives pain with its ſting, but if it is taken from it, the bee can never be of any uſe afterwards. It is the ſame throughout all nature. Every thing that appears hurtful, is, in reality, indiſpenſably neceſſary. Wherefore, then, has man the preſumption to decide what is hurtful or uſeful in nature? Who can ſay it is contrary to the wiſdom of God that we ſhould ſometimes feel pain? Do not the moſt diſagreeable things often procure us the greateſt advantage? In general, it is certain, that natural things are only hurtful by accident: and if we receive harm from them, we may often blame our own imprudence.

LESSON LXIX.

SINGULARITIES IN THE VEGETABLE KINGDOM.

THE variety of animals is ſo great, that it appears at firſt difficult to find connection between them and plants. Some beaſts live only in water; others only on land, or in the air; ſome can live in either, or both equally. But it may be ſaid literally, that it is the ſame in reſpect to vegetables. There are plants which only live in the ground; others that only grow in water; others that can bear no moiſture; others, ſtill, which live equally in land or water: there are even ſome that live in the air. There is in the iſland of Japan a tree, which, contrary to the nature of all other plants which require moiſture, cannot bear it. As ſoon as it is wet, it withers, and the only way

to

to ſave it from dying is to cut it down to the root, to dry it in the ſun, and afterwards plant it in a dry and ſandy ſoil. It is known, that a ſort of muſhroom, of moſs, and other little plants, ſwim in the air. The vegetation of the truffle is ſtill more ſingular: this extraordinary tubercle has neither roots, nor ſtalk, nor leaves, nor bloſſom, nor even any viſible ſeed: it draws its ſuſtenance through the pores of its bark. But how it is produced, or why, in general, there ſhould be no other herb where theſe ſort of muſhrooms grow, and the earth be light and full of crevices, has not yet been accounted for. There is no plant which can better be compared to the land and water animals, than that ſort of membraneous moſs, called *noſtoch*. It is an irregular body, a little tranſparent, and of a pale green colour. It trembles when touched, and is eaſily broken. It can only be ſeen after it has rained; it is then found in ſeveral places, but chiefly in uncultivated ground, and along the ſides of ſandy roads. It is formed almoſt in a moment; for when in ſummer walking in a garden, not the leaſt trace of it is ſeen; on a ſudden a ſtorm of rain falls, and in an hour after, in the ſame ſpot, the whole walk will appear covered with a great quantity of it. For a long time it was ſuppoſed that the *noſtoch* fell from the ſky; but it is now known to be nothing but a leaf which imbibes a great quantity of water. This leaf, to which no root has been diſcovered. is in its natural ſtate when it is well impregnated with water; but heat, or a high wind, makes the water evaporate in a few hours, and then the leaf contracts, ſhrinks, and loſes its tranſparency and colour. From this circumſtance it appears to grow ſuddenly, and to be created in a wonderful manner with the rain; as a freſh ſhower falling on it, when it is withered and inviſible, revives and makes it again appear. But

there

there are ſtill more ſingularities worth obſervation among the vegetables. The whole atmoſphere is filled with millions of inviſible plants and ſeeds. Even ſeeds of a larger ſort are ſcattered by the wind all over the earth; and as ſoon as the air has carried them to the places where they can thrive, they become plants; and it requires ſo little for that purpoſe, that it is difficult to conceive whence they can draw what is neceſſary for their growth. There are conſiderable plants, and even trees, that take root and grow in crevices of rocks, without the leaſt earth. Vegetation is ſometimes formed inconceivably quick: for example, muſhrooms and water-creſſes, if the ſeed of them is put into wet linen, become a ſalad in twenty-four hours. There are plants which appear to have ſcarce any life, and yet they continue to exiſt. We often ſee willows not only hollow and decayed within, but the outer bark ſo hurt that there ſcarce remains an eighth part of it. Theſe trunks, however, poor as they are, break out again every ſpring, and ſhoot into numberleſs branches and leaves. How wonderful it is, that the nutritive juice of plants is not only ſupplied by means of the root, but by the leaves alſo, which draw it from the air, and in ſome degree pump it in; and that there ſhould be plants, the branches of which become roots, and the roots branches, according as they are turned in planting them! The great age alſo to which trees arrive, how ſurpriſing it is! There are apple-trees, which muſt be above a thouſand years old; and, if we calculate in the groſs, the fruit which ſuch a tree produces every year, we cannot but admire the fertility of a pippin, which can ſingly ſupply all Europe with trees and fruit of that ſort.

But we ſhould never have done, if we were to purſue theſe reflections as far as they might lead. Every thing is full of wonders. Every things

marks to us a Being of perfection, whose power, wisdom, and unbounded goodness, all join in heaping upon us continual blessings and enjoyments. Shall we not sanctify the pleasures which the country and gardens afford us, by contemplating the wonders of the Lord; by reflecting on them; by looking from the creature to the Creator; from the flower, to Him who made it.

LESSON LXX. TWENTY-FOURTH WEEK.

THE LOADSTONE.

THE loadstone is the most singular of all minerals in its properties. It is a stone of a dark grey colour, and has the virtue of attracting iron. This virtue is not equal throughout the whole stone, but resides chiefly in two of its points, called the poles of the loadstone. When this stone is suspended by a string, and unconfined, it constantly points one of its poles to the north, and the other to the south, if first put in motion, and then left to itself. This regular direction, which only varies a little in some particular parts of the earth, has given the name of the northern pole to that which points to the north, and southern to that which points to the south. The two properties of attracting iron, and pointing toward the north, is communicated to iron by rubbing it against the loadstone. This discovery introduced the magnetic needle, so indispensably necessary to navigators in long voyages; which proves, that things may become very useful to the world, though at first sight they appear of little importance; and that, in general, the knowledge and study of the magnificent works of the creation is of infinite advantage

to

to the human mind. Theſe virtues in the loadſtone prompted the naturaliſts to examine further into it, with the hope, not only of finding out the cauſe of ſuch ſurpriſing effects, but of diſcovering new properties in the ſtone. They were more fortunate in the latter than in the former. It was obſerved, that the loadſtone does not at all times, and in all places, point to the north; but that it ſometimes inclines a little to the eaſt, ſometimes to the weſt, ſometimes more and ſometimes leſs. It was obſerved, that its attractive powers were equally ſtrong, though bodies were placed between the iron and the ſtone, which might be ſuppoſed to prevent the effect. Glaſs, fire, water, men, and animals, with every metal, except iron, give free paſſage to the magnetic effluvia. It was diſcovered, that in two loadſtones, the two poles of the ſame name, the two northern and two ſouthern poles, repulſed each other, and ſeemed to fly one from the other. It was therefore concluded, that the power of attraction might be in the iron as well as in the loadſtone, as they ſeemed to attract each other equally. In order to be convinced of this, one need only hang a loadſtone on one end of the beam of a balance, and put an equal weight at the other end, and when the loadſtone is balanced, and not in motion, to place a bit of iron under it: the loadſtone will be immediately drawn down by the iron, and the other weight will fly up. If their ſituation is reverſed, the loadſtone will attract the iron in the ſame manner.

However ſingular theſe things are in the loadſtone, there is another circumſtance no leſs worthy of obſervation; which is, that all the endeavours and all the ſagacity of the lovers of wiſdom, who have taken ſuch pains to diſcover the cauſe of theſe wonderful effects, have been hitherto fruitleſs. The loadſtone is ſtill a myſtery to the human under-

ſtanding. Let us not then be ſurpriſed, that in religion, which is above all that can affect the ſenſes, we ſhould find myſteries we cannot penetrate, and the perfect knowledge of which is reſerved for the future ſtate; but let us remember, that a conſiderable part of the happineſs of the world to come, will conſiſt in having a more perfect knowledge of all that can contribute to complete our felicity, and to prove the glorious attributes of the Being of beings,

LESSON LXXI.

THE WISDOM OBSERVABLE IN THE CONSTRUCTION OF THE BODIES OF ANIMALS.

THE formation of the animal body affords the moſt ſtriking proof of Divine Wiſdom. For, as ſome animals were to reſide chiefly in the air, others on the earth, and others in the water, it was neceſſary that their conſtruction ſhould be conformable and adapted to their ſituation and different kinds of life. The wiſdom with which God has done this cannot be too much admired. Every thing is ſo exactly diſpoſed as each animal requires it, that if their conſtruction had been like any other but their own, they would have ſuffered by it conſiderably, and could not have fulfilled their deſtination. The birds of prey are provided with nails, ſtrong claws, ſharp and hooked bills, that they may with the more ſecurity and eaſe catch their prey. Thoſe who are to ſeek their food in marſhy places require a long bill and long legs; as it was neceſſary that thoſe which live in water ſhould have the lower part of the body very large, a long neck, membranes or ſort of oars to the feet, with an oilineſs in the feathers, to make them glide ſmoothly.

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The insects that live on prey have mouths shaped like nippers; and those that suck their food are provided with a proboscis or trunk. Why have the hares or rabbits full-set eyes, but in order to see so much the better to avoid the snares and dangers to which they are exposed? Why are the eyes of the mole so sunk and small, but that living under ground it does not require much sight? Why is the crystalline of the fishes eye so round, but to compensate for the refraction of the rays of light; whereas animals that live in the air have a crystalline, in the form of a flat sphere? Why have animals whose eyes move, but two, whilst those that cannot move theirs have several? Why have the animals who seek their prey in the dark, larger pupils and more brilliant eyes? Why does the eye of the hen answer the double purpose of telescope and microscope, but that she may seek the very smallest seeds in the earth or gravel, and discover at a distance the birds of prey that might seize upon her chicks? With what amazement must we be struck in considering the apparatus for the organs of animals in respect to their several motions! What a multitude of limbs! what suppleness! what flexibility! Some animals move slow, others quick; some with two feet, others with more; some with both wings and feet, others without either. The slowness or swiftness of motion is always regulated according to the different wants of each animal. Who gave to serpents and other reptiles the power to contract and stretch out their bodies, to roll themselves up, and to dart out afterwards from one place to another to seize their prey? Who formed the fish in such a manner, that, by means of their bladder, they can rise and fall in the water at will? Who taught the snail to contract his body, and bring water into its little house, when it wishes to fall on the ground? What art appears in the for-

mation of birds, in every part of their bodies, and particularly their wings! How well their body is formed for flight: ſmall and ſharp before, and increaſing gradually till it is of a proper bulk. This adapts it for cutting the air, and making itſelf a paſſage through that element. The feathers are all arranged with much art, and laid one over another in a regular order, to facilitate the motion of the body, and at the ſame time to ſerve as a covering to defend it from the ſeverity of the weather. Though firm and cloſe together, they can ſpread, riſe up, ſwell, and take up more ſpace, juſt as the bird requires it. The wings, which are the chief inſtruments of flight, are put in the propereſt place to balance the body exactly. What admirable work there is in every feather! What proportion we ſee in the manner of placing them! They are always ſo placed as to agree exactly with the length and ſtrength of each other, and the large ſerve to ſupport the ſmaller. In the bony part of the wings, what a multitude of joints, which open, ſhut, or move, according as is neceſſary, either to extend the wings or draw them cloſe to the body! What extraordinary ſtrength in the breaſt-bones and muſcles, that the bird may cut the air with more rapidity! What incomparable art in the formation of the tail, to make it in ſome meaſure ſerve as a rudder to direct the flight, and help the bird to aſcend and deſcend in the air, and prevent the unſteadineſs of the body and wings!

Who is there that will not in this acknowledge the ſupreme intelligence of our Creator and Benefactor?

LESSON

LESSON LXXII.

THE DEW.

THE wiſe Ruler of the world, who watches continually over his children, and provides for all their wants, makes uſe of more than one means to render the earth fruitful. Sometimes it is by inundation, like the Egyptian river Nile, which has the ſingular property of overflowing its banks at certain marked periods, to water a country where it never rains. Sometimes it is by rains, which fall more or leſs frequently, in order to cool the air, and water the parched ground. But the moſt common means, the ſureſt, and moſt univerſal, and that which men the leaſt attend to, is the dew. This ineſtimable gift of Heaven, which even in years of the greateſt drought ſupports and preſerves the plants from periſhing, is thoſe ſparkling drops ſeen in ſuch profuſion morning and evening on the leaves of trees and plants. The dew does not fall from above, as was formerly imagined, but it is now generally allowed, that it ariſes from the earth. In order to be convinced of this, one need only cover a plant with a glaſs bell, and it will appear that the leaves collect in the night a greater quantity of dew drops than the leaves of the other plants which are expoſed to the air. This certainly would not be the caſe, if the dew fell from above, and if it did not riſe from the ground. Nothing is more eaſy, than to comprehend how it is formed: for nobody is ignorant, that the rays of the ſun, and the heat which is caſt on the earth, continually looſens a multitude of thin particles from off every thing; ſome of which riſe into the atmoſphere, and the reſt collects in the form of drops of water. This account of the dew explains to us, how it

happens that it is ſometimes hurtful, and ſometimes not ſo. Its nature evidently depends on the quality of the vapours of which it is compoſed. The wind carries away the light exhalations as ſoon as they are formed, and prevents them from falling in drops. This is the reaſon that there is moſt dew when the air is very calm. By this wiſe plan of the Creator, the plants can vegetate and grow in countries even where there is no rain; for the ſoil of thoſe parts being ſandy, porous, and very moiſt underneath, the heat draws out a great quantity of dew, which ſupplies the place of rain.

Thoſe different methods which Providence makes uſe of to moiſten and fertilize the earth, ought to remind us of thoſe employed to improve the barren heart of man, and to make it fertile in good works. How many hardened hearts oblige him to ſpeak in thunder and lightning, as formerly on Mount Sinai! Leſs terrible means are employed to ſave and effect others; with a gentle, mild, and perſuaſive voice, he awakens their conſciences, and refreſhes their ſouls with the beneficent dew of his grace. Let this conduct of our Heavenly Father ſerve as a model for ours. Let us employ all ſort of means to reclaim our fellow-creature, to make him better; but let us particularly endeavour, to gain him rather by kindneſs than by puniſhment. Let us imitate the beneficence of the Lord: we ſee how he refreſhes the parched earth with dew; he revives and gives new life to the plants. Let us endeavour to revive the hearts of the afflicted with benefits, and to pour as many bleſſings on our fellow-creatures as the dew ſheds upon the plants.

LESSON

LESSON LXXIII. TWENTY-FIFTH WEEK.

LIFE AND LABOURS OF THE BEE.

IN the fine days of the ſummer, in that time of cheerfulneſs and joy, every thing is in motion; every thing throughout the animal world is full of life and activity; but there are no creatures ſo active as the little republic of bees. At leaſt, of all the inſects round us, there are none we can better learn to be acquainted with, or which can afford a more pleaſing ſcene. The bees aſſemble in great numbers, either in hollow trees and cavities, or in a ſort of baſkets, called hives, where they are collected by the art of man. They diſperſe on all ſides, and, by means of their trunk, they gather honey and wax from the ſtamina and juice of the flowers. When their harveſt is made, they convey it into their ſtorehouſe, which they fill from top to bottom with cells in form of hexagons. They inhabit ſome of theſe cells; others are deſigned to receive the eggs, and to lodge their young; and the reſt ſerve as magazines to depoſit their winter's proviſion of honey in. Amongſt theſe bees, which form altogether but one family, there is one larger than any other, which is a female, and therefore called their Queen. To her alone all the young bees born in a hive owe their birth. From the eggs ſhe laid in the cells there come out worms, which the working bees feed with their trunks. Afterwards this worm remains near fifteen days to all appearance dead in its cell, which is cloſed with a little wax lid. In this inanimate ſtate it is called nympha. When its time is accompliſhed, it opens its tomb, and comes out in the form of a young bee. The bees have two horns on their heads,

which guard their eyes, and warn them of dangers. They have fangs or claws they make uſe of in their work, and a trunk, or hollow tube, which they can draw in and out of its caſe as they pleaſe. This inſtrument, ſupple and moveable in every way, reaches to the very bottom of the cup of the flowers, where they gather their honey, and paſſes through the caſe into the bag of honey placed within their bodies, from whence the honey is afterwards poured into the cells of the ſtorehouſe. The bees have ſix feet: with the two firſt, and their fangs, they form the wax or meal of the flowers into little balls; and with their middle feet they put them into a hollow, ſhaped like a ſpoon, which they have in their hind feet, which are alſo furniſhed with hair, in order to retain the wax, and prevent it from falling when they are flying. Laden thus, they return to their cell, without loſing their way, though they are ſometimes ſeveral miles from it. When they arrive, they find other bees waiting for them, to aſſiſt them in unloading their booty, and then they all work in common to employ thoſe proviſions for the general uſe of the hive. They ſtop every crevice with wax, to keep out any foreign animal; but leave openings for themſelves to go in and out. The queen, and the working bees have, at the extremity of the body, a ſting encloſed in a caſe, which they make uſe of to wound or kill their enemies: but the wound they give is generally fatal to themſelves, when the ſting is drawn from their body.

Every thing in thoſe little animals muſt excite our admiration; the formation of their limbs, ſo regular and ſo well adapted to their kind of life; the care they take of their young; the art with which their cells are built, their activity, their induſtry, and intelligence. Let us never paſs by a bee-hive with indifference. Let us admire them, and

and this admiration may lead us to more ſublime thoughts. If we love to reflect on our Creator, we ſhall find him here. This intereſting ſcene will lead us to him; and we ſhall adore his wiſdom, his power, and his goodneſs, in the production of theſe little creatures.

LESSON LXXIV.

CATERPILLARS.

THOUGH theſe inſects are ſo diſagreeable to the lovers of gardens, they nevertheleſs deſerve our attention. Caterpillars generally live upon our trees, and we have ſuch an averſion to them, that wherever we meet with them we deſtroy them. This is the reaſon we do not deign to honour them with a look, and ſtill leſs to examine them attentively. And yet there is no doubt but theſe inſects may very agreeably amuſe an attentive obſerver of nature. Let us here try to prove it. Perhaps, by raiſing the curioſity of thoſe who have hitherto neglected them, they may be induced not to trample them under foot, without at leaſt firſt obſerving their wonderful formation, and taking from thence occaſion to look up to the Creator. The number of ſpecies of caterpillars already known amounts to more than three hundred, and there are new ones daily diſcovered. Their ſhape, their colour, their form, their inclinations, and way of life, all differ in ſome reſpects; but this circumſtance they have in common, that they are compoſed of rings, which, by moving to and fro, carry the body wherever they want to go. Nature has given them two ſorts of feet, which have each their particular uſe. The ſix fore-feet are a ſort of hooks, which they make uſe of in taking a faſt hold and

clinging to any thing. The ſoles of the hinder-feet are broad, and armed with little ſharp nails. With the hooks they draw to them the leaves, the graſs, and whatever they want for food, and they fix the fore-part of their body with them while they are drawing up the hind rings. The hinder-feet ſerve to keep them firm, and to hold by whatever they are to reſt upon. When they are on a branch or a leaf, they can ſeize on food at ſome diſtance; for by hooking themſelves on with the hind-feet, they ſtand up, and raiſe the fore-part of their body, move it about, and poiſe it in the air on every ſide, get conſiderably upon the leaf, reach their food, and take it with their claws. However adapted the body of the caterpillar is to its ſeveral wants, it is remarkable that its ſtate is but tranſient, that the limbs laſt but a certain time, and that this creeping worm becomes a chryſalis without feet or motion, till it is metamorphoſed into a creature claſſing with the inhabitants of the air. Were it for this reaſon only, the caterpillars would be worth our attention. Towards the end of ſummer, and often ſooner, after having ſatiated themſelves with verdure, and after having changed their coat ſeveral times, they ceaſe to eat, and begin to build a houſe, in order to end their life in it, with the caterpillar ſtate, and to be afterwards transformed into butterflies. The chryſalis is full of a ſort of thick milk, which ſerves for food to the butterfly till it comes out. When it is entirely formed, and its parts arrived at conſiſtency, and that a gentle warmth invites it to quit its priſon, it makes itſelf a paſſage through the end of the chryſalis that is largeſt, and at the ſame time the thinneſt. The head (which has always been turned towards that end) diſengages itſelf, the horns lengthen, the feet and wings ſpread out, the butterfly takes wing and flies away. It preſerves none of its former

ſtate.

ſtate. The caterpillar which changed into the chryſalis, and the butterfly that comes out of it, are two animals totally different. The former was rough, hairy, and often hideous; the other is adorned with the livelieſt colours. The former limits itſelf to a groſs food; the latter goes from flower to flower, and freely enjoys all nature, of which it is itſelf the ornament. Will not this deſcription reconcile every one to theſe inſects, and put an end to all averſion to them. Perhaps ſome may ſtill think they have a right to aſk, To what purpoſe, after all, are theſe caterpillars? Would it not be better to be entirely free from them? No; on the contrary, it is certain, that the world would not be as perfect as it is, if there were no caterpillars in it. Take away theſe inſects, and you deprive the birds of a conſiderable part of their ſubſiſtence. As the birds were to feed on caterpillars, it was juſt that the Creator ſhould ordain for their food the leaves and plants, to which they have as good a right as us. It is true that the voracity of theſe animals makes them ſometimes troubleſome to mankind; but this is an evil which the Creator permits with much wiſdom. For the miſchief the caterpillars ſometimes do may ſerve to humble us, and make us recollect the uncertainty of all our earthly poſſeſſions. And even ſuppoſing we could not penetrate into the reaſons for forming ſuch creatures, we ſhould not therefore have a right to deny their utility. We ought, on the contrary, to take occaſion from thence to acknowledge our ignorance, and truſt in the wiſdom of Him who formed all things.

LESSON

LESSON LXXV.

THE NIGHTINGALE.

THE nightingale is a muſician of the firſt rank amongſt the inhabitants of the air. When all the birds, who during day entertained us with their notes, ceaſe to be heard, it is then that the voice of the nightingale is raiſed to animate the woods and groves. When we liſten to the brilliant ſounds of that voice, we are apt to conclude, that the bird muſt be large, that the throat muſt have great ſtrength; and the inimitable charm of her melodious notes makes us preſume ſhe ſurpaſſes all others in the beauty of her form. But it would be to no purpoſe to ſeek theſe advantages in the nightingale: it is a bird of poor appearance, whoſe colour, form, and the whole of its exterior, is void of any thing attractive or majeſtic, and has nothing in the leaſt diſtinguiſhing. Nature has, however, compenſated for its plainneſs, by giving it a voice irreſiſtibly charming. Liſten to its fine long quivering notes: what variety, ſweetneſs, and brilliancy in them! When ſhe begins her ſong, ſhe ſeems to ſtudy and compoſe beforehand the melodious notes ſhe wiſhes to be heard. She begins ſoftly; then the notes ſwell gradually till they run with the rapidity of a torrent: ſhe goes from ſerious to gay; from ſimple notes to the wildeſt warblings; and has, throughout the whole, the art to pleaſe the ear.

This bird may give riſe to many uſeful and edifying reflections; for example, we learn this truth from it, that homelineſs of body is ſometimes united with very eſtimable qualities, and does not exclude beauty from the ſoul. How unjuſt then are thoſe who, only attaching themſelves to the features of the face, and to exterior qualities, praiſe or blame

blame nothing but what ſtrikes their ſenſes, and deſpiſe thoſe who have bodily defects. Let us learn to judge with more equity. Any man, though deprived of the advantage of figure and fortune, who proves himſelf by his conduct to have the ſoul of a ſage or a ſaint, is by much the more worthy of our eſteem. It is the perfection of the ſoul only that gives true merit to man, or is worthy our admiration; the reſt can only ſeduce thoſe who do not know the value of wiſdom and virtue. Have we not often known perſons, neither diſtinguiſhed by rank or exterior qualities, who have done the greateſt ſervices to mankind, and have often ſhewn more greatneſs of ſoul than others poſſeſſed of the moſt beautiful perſon and fineſt form. It is a leſſon not to truſt to appearances. Thoſe we deſpiſe may often prove to be ſuperior to ourſelves.

LESSON LXXVI. TWENTY-SIXTH WEEK.

THE PLEASURES WHICH SUMMER AFFORDS TO OUR SENSES.

SUMMER has inexpreſſible charms, and gives us daily proofs of the infinite beneficence of our Creator: it is the happy ſeaſon in which he pours out the treaſures of his bleſſings in the greateſt abundance on every living creature. Nature, after having revived us with the pleaſures of ſpring, is continually employed, all the ſummer, in providing for us every thing to pleaſe our ſenſes, to make our ſubſiſtence eaſy, to ſatisfy our wants, and awaken in our hearts juſt ſentiments of gratitude. Before our eyes there grows, by virtue of the ſecret laws of nature, an innumerable quantity of fruit in the fields and gardens: fruits which, after having pleaſed

pleaſed the ſight, may be gathered and preſerved for our food. The flowers afford the moſt agreeable variety to our ſenſes; we admire their rich dreſs, and the inexhauſtible fertility of nature in the multiplicity of their ſpecies. What variety and beauty alſo in the plants, from the humble moſs to the ſtately oak! Let us climb the higheſt mountain, ſeek the cool ſhade of the woods, or deſcend into the valley, we ſhall every where find new beauties. A multitude of objects ſtrike our eyes at once, all different from each other; but each in itſelf has charms enough to fix our attention. There we ſee innumerable flowers; here living creatures of different kinds. If we lift up our eyes, they are delighted with the blue ſky; if we caſt them on the ground, they are refreſhed by the beautiful verdure with which it is clothed. Our ear is charmed with the cheerful notes of the winged ſongſters; the variety and ſimplicity of their melody fills the ſoul with the ſweeteſt ſenſations. The murmuring of the brooks, and the ſilver waves of a fine flowing river, alſo pleaſe the ear and eye. It is to indulge our taſte that the ſtrawberries and other pleaſant fruit ripen; while at the ſame time they cool the blood. Our barns and granaries are filled with the new productions of the fields and gardens, which afford us the moſt wholeſome agreeable food. The ſmell is ſtruck with the ſweet perfume that exhales on every ſide. In a word, a thouſand pleaſing objects affect the ſenſes, and raiſe our ſenſibility. Numerous flocks feed on the profuſion of bountiful nature, to procure us pleaſant and wholeſome milk and nouriſhing meats. Abundant rains moiſten the ground, and open to us new ſources of bleſſings. Tufted trees and groves afford us a delightful ſhade. All that we ſee and hear, all that taſte or ſmell can convey, increaſes our pleaſures, and contributes to

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our happineſs. But the creation is a ſtill greater and more enchanting object for the mind than for the ſenſes. In points which the latter cannot reach, the mind diſcovers beauty, harmony, variety, and new pleaſures.

LESSON LXXVII.

ECLIPSES OF THE SUN AND MOON.

IT is admirable, that, in an age ſo enlightened as ours, not only the multitude, but even thoſe who pretend to be ſuperior to the common people, ſhould be ſtill ſo ignorant in reſpect to thoſe bodies. From thence proceed the ſuperſtitious notions which are raiſed by eclipſes of the ſun and moon. If any one took the trouble to inquire into the cauſe of them, it would be found how abſurd it is to ſhut up wells during an eclipſe, to prevent the water from acquiring any hurtful quality, or to take other ſuperſtitious precautions, which are melancholy proofs of the ignorance and want of piety in mankind. Let us then examine into this phenomenon, becauſe it is in itſelf very remarkable, and furniſhes us with a new occaſion to glorify our great Creator. The eclipſe of the ſun is an effect entirely natural; it is cauſed by the moon paſſing between the earth and the ſun. But it can only take place when the moon, which is an opaque body, and dark in itſelf, comes nearly in a direct line between the ſun and our earth. It then conceals from us part of that globe or the whole of it. The former is called, in the almanacks, a partial eclipſe, the latter a total eclipſe. Thus the ſolar eclipſe is nothing more than the ſituation of the earth when the moon paſſes between it and the ſun, interrupting the ſolar rays. We

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muſt not imagine that the ſun is at that time really darkened. It is only concealed from us. It retains its uſual ſplendor; and all the difference is, that the rays which iſſue from it cannot reach us, becauſe the moon is placed between the ſun and our globe. This is the reaſon that a ſolar eclipſe is never viſible at the ſame time in all parts of our earth; for, unleſs the ſun had really loſt its light, the eclipſe could not be viſible at the ſame time in every point of the hemiſphere. It is, on the contrary, always more in one country than in another, and in ſome places it is never ſeen at any time. The moon not only darkens our earth ſometimes, but the latter alſo caſts its ſhade upon the moon, and by that means intercepts the rays of the ſun from it, either wholly or in part; and this is called an eclipſe of the moon: but it can only be when the moon is at one ſide of the earth, and the ſun at the oppoſite ſide, and conſequently when it is full moon. As that planet is really darkened by the ſhadow of the earth, the eclipſe is perceived at the ſame time on all the points of an hemiſphere of our globe. Some people may aſk, what is the uſe of eclipſes of the ſun and moon? To thoſe even who only calculate the uſe of natural things from the immediate advantage that accrues to them, the eclipſes are of importance. It is by their means that the true poſition and diſtance of towns and countries are known; and it is from thence that we have been able to trace accurately the geographical maps of the moſt remote countries. Eclipſes, if well obſerved, ſerve alſo to confirm chronology, and to direct the navigator, by ſhewing him how far he is from the eaſt or weſt.

However inattentive we may be to the importance of theſe advantages, they are not the leſs eſſential to us.

LESSON

LESSON LXXVIII.

THE STALK OF THE WHEAT.

WE ſee that the wheat is growing every day, that the tender ears of corn are inſenſibly ripening, in order to furniſh us, ſome weeks hence, with wholeſome bread: a precious bleſſing with which nature rewards the labours of man. Let us caſt our eyes on a field of wheat; let us calculate the millions of ears of corn which cover one ſingle field; and let us reflect on the wiſdom of thoſe laws which procure ſuch an abundance for us. How many preparatives were neceſſary to furniſh us with this moſt indiſpenſable of all food! How many progreſſive changes were to take place in nature before an ear of corn could ſpring up! It is now almoſt ready to produce its fruit, and invites us to reflect on its conſtruction. When the grain of wheat has been ſome time in the ground, it ſhoots upwards a ſtalk, which riſes perpendicularly, but only grows ſlowly, that the wheat may have time to ripen. It is for very wiſe reaſons that it grows four or five feet high, in order to preſerve the grain from the moiſture of the ground, which would rot it. The height of the ſtalk contributes alſo to the depuration of the nouriſhing juices which the root conveys to it; and its round form aſſiſts this operation; for by that means the heat penetrates equally into every part of the ſtem. But how is it poſſible that ſo ſlender a ſtalk can ſupport itſelf, and bear up its fruitful head without ſinking under the weight, or without being beat down by a breath of wind? The Creator guarded againſt this inconvenience in the formation of the ſtem. He furniſhed it with four very ſtrong knots, which in ſome meaſure ſerve

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as ſcrews ſtrengthening it, without taking from it the power of bending. The conſtruction of theſe knots alone ſhew the greateſt wiſdom. Like a very fine ſieve, they are full of little holes, and through theſe orifices the juices riſe up, and the heat of the ſun penetrates into them. The heat attenuates the juices which collect there, and purifies them, by making them paſs through a ſort of ſieve. The ſtalk is liable to be beat down by ſtorms and heavy ſhowers of rain, but its not being thick ſecures it. It is flexible enough to bend without breaking.

From out the chief ſtem there ſhoot others not ſo high, as well as leaves, which collecting drops of dew and rain, furniſh the plant with the nutritive juices it requires. In the mean time, the grain, that eſſential part of the plants, forms itſelf by degrees. To preſerve theſe tender ſprouts from the accidents and dangers which might deſtroy them at the inſtant of their birth, the two upper leaves of the ſtalk unite cloſely at the top, both to preſerve the ear of corn, and to draw to it the nouriſhing juices. But as ſoon as the ſtem is formed enough to ſupply the grain of itſelf with proper juices, the leaves gradually dry and drop off, that none may be taken from the fruit, and that the root may have nothing more than neceſſary to nouriſh it. The bearded corn waves gracefully, and its points ſerve for ornament, as well as defence againſt the birds. Refreſhed with gentle rains, it thrives till the appointed time, and grows every day more yellow, till, ſinking at laſt under the weight of its riches, it bends its head to the ſickle.

What wonderful wiſdom and power appear in the conſtruction of one ſingle ſtalk of wheat, and yet we ſeldom pay attention it, becauſe it is daily before our eyes. But what other proof of goodneſs

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can the Creator give us, if we are insensible to this. O man! open thy heart to the sweet sensations of gratitude and joy: learn to think as a man, to enjoy the noblest pleasure a mortal is capable of in this world, that of tracing thy Creator in every creature.

LESSON LXXIX. TWENTY-SEVENTH WEEK.

FOREIGN PLANTS.

ALL our corn, and a great number of our vegetables, come from foreign countries, and generally from warmer climates than ours; most of them from Italy; Italy got them from Greece, and Greece had them from the east. When America was discovered, a great number of plants and flowers were found there, which were till then unknown, and which have since been transplanted into Europe with much success. The English still take a great deal of trouble, at this time, to cultivate the North American plants in their country. Most of the different sorts of corn, of which men and animals make their best food, are grass plants; but though our fields are now covered with them, they are foreign to us. Rye and wheat are indigenious in Little Tartary and Siberia, where they still grow without culture. As for barley and oats, we are ignorant indeed from whence they come, but it is certain they are not indigenous in our climate, or it would not be necessary to cultivate them. Rice is the produce of Ethiopia. Since the beginning of this century, it has been cultivated also in America; and they now send us from thence, every year, vessels entirely laden with those useful seeds. — The buck-wheat comes orignally from

from Afia; the Crufades introduced it into Italy, from whence it came into Germany. Moft of our herbage and vegetables alfo have a foreign origin. Borage comes from Syria, creffes from Crete, colliflower from Cyprus, and afparagus from Afia. We are indebted to Italy for the chervil. Aneth comes from Portugal and Spain, fennel from the Canary-Iflands, anife and parfley from Egypt, garlic is the produce of the eaft, fhallots come from Siberia, and horfe-radifh from China. We owe the kidney-beans to the Eaft-Indies, the gourds to Aftracan, the lentils to France, the potatoes to Brazil. The Spaniards found tobacco at Tobacco, a province of Jucatan in America. The ornaments of our gardens, the moft beautiful flowers, many of them are foreign productions. Jeffamine comes from the Eaft-Indies, the elder-tree from Perfia, the tulip from Cappadocia, the narciffus from Italy, the lily from Syria, the tube-rofe from Java and Ceylon, the carnation and pink from Italy, the after from China, &c.

With what goodnefs does God thus provide for our happinefs and enjoyment, by making even the moft remote countries contribute towards it! But let us, at the fame time, learn the conftitution of the globe which we inhabit. There is an univerfal tranfmigration over all the earth: men, animals, and vegetables, tranfplant themfelves, and go from one region to another, and this tranfmigration will only end with our globe.

LESSON LXXX.

THE SILK-WORM.

THE race of caterpillars, which divide into two general claffes (thofe of nocturnal and diurnal butterflies) have alfo different families among

among them, each of which has its diſtinct character and properties. The name of ſilk-worm is given to one of theſe: this caterpillar, like the others, is compoſed of ſeveral moveable rings, and is well furniſhed with feet and claws to reſt and fix itſelf where it pleaſes. It has two rows of teeth, which do not move up and down like ours, but from right to left; in order to preſs, cut, and tear the leaves every way. The whole length of its back, we may ſee through its ſkin a veſſel which ſwells every now and then, and performs the function of the heart. This worm has nine orifices on each ſide, which correſpond with ſo many lungs, and aſſiſts the circulation of the nutritive juice. Under the mouth it has a kind of a reel, with two holes, through which it puts out two drops of the gum with which its bag is filled. They are like two diſtaffs, continually ſupplying the materials for making its thread. The gum which runs through the two holes, takes that form, and lengthens into a double thread, which loſes ſuddenly its fluidity, and acquires the conſiſtence neceſſary to ſupport or to contain the worm. When it is time to be encloſed in it, it joins the two threads together, gluing them one over another with its fore-feet. This double thread is not only very fine, but alſo very ſtrong, and of an aſtoniſhing length. Each ſilk-worm's bag has a ſilk thread near as long as 500 ells; and as this thread is double, and all along joined together, each bag muſt contain 1000 ells of ſilk, though the whole together does not weigh above two grains and an half. The life of this inſect, while it is ſtill a worm, is very ſhort; and yet it paſſes through different ſtates, which inſenſibly bring it to perfection. At the firſt coming out of the egg, it is extremely ſmall, perfectly black, and its head is ſtill a finer black then the reſt of its body. Some days after, it begins to grow

grow whitiſh, or of a dark grey colour. Its coat then becomes ragged and dirty. It throws it off, and appears in a new dreſs. It becomes large, and much whiter, but rather tinged with green, as it feeds on green leaves After a few days, more or leſs, according to the degree of heat, and quality of its food and conſtitution, it ceaſes to eat. It goes to ſleep for about two days; then works and frets itſelf extremely. It becomes almoſt red with the efforts it makes. Its ſkin wrinkles and ſhrivels up. It throws it off a ſecond time, and with it caſts away its feet. Behold it new dreſſed three times in the ſpace of three weeks or a month. It begins again to eat, and might then paſs for a different creature, ſo unlike in head, colour, and form, to what it was before. After having again eaten for ſome days, it falls again into a lethargy, in recovering from which it changes once more its coat. That is the third ſkin it has thrown off ſince it came out of the ſhell. It ſtill continues to eat ſome time, then renouncing all food, it prepares itſelf a retreat; and draws out of its body a ſilk thread, which it wraps round itſelf much as we wind thread round an oval piece of wood: this conſiſts of extreme fine ſilken threads. It reſts quietly in the bag it has ſpun for itſelf, until the end of a fortnight, when it would break through, and make its way out, if it was not prevented by putting it into an oven or hot ſun in order to kill it. Theſe ſilk bags are thrown into hot water, and ſtirred about with birch twigs, to looſen the ends of the ſilk, which are afterwards wound on reels made for the purpoſe.

Thus it is to a worm, or a caterpillar, that we owe the luxury of our clothing. This reflection ought to humble us. Can we be vain of the ſilk with which we are covered, when we conſider to what we owe it, and how little we ourſelves contribute

tribute towards it! Let us reflect, that even the moſt deſpicable things have been created for the advantage and uſe of mankind. A worm, which we ſcarce deign to look at, becomes a bleſſing to whole provinces, a conſiderable object of trade, and a ſource of riches.

LESSON LXXXI.

THE RAINBOW.

WHEN the ſun reflects its rays on drops of water which fall from the clouds, and we are placed with our backs to the ſun, and with the clouds oppoſite to us, we obſerve a rainbow. We may conſider the drops of rain as little tranſparent balls on which the rays fall, and are refracted. From thence proceed the colours in the rainbow. They are ſeven in number, and in the following order: red, orange, yellow, green, blue, purple, and violet. Theſe colours appear ſo much the more lively, according as the cloud behind is darker, and the drops of rain fall the cloſer. The drops falling continually produce a new rainbow every moment, and as each ſpectator has his particular ſituation from whence he obſerves this phenomenon, it ſo happens, that two men cannot, properly ſpeaking, ſee the ſame rainbow. This meteor can only laſt while the rain continues to fall. To conſider a rainbow merely as a phenomenon of nature, it is one of the fineſt ſights imaginable. It is a picture the moſt beautifully coloured of any the Creator has given us. But when we reflect, that God has made this meteor a ſign of his pardon, and of the covenant he vouchſafed to make with mankind, we find ſubject for more than one edifying reflection. There cannot be a rainbow when it rains

over the whole horizon. Every time, then, that this beautiful meteor appears, we may be certain that we have no deluge to apprehend, as in a deluge it muſt rain violently from every part of the ſky. Thus when the ſky is only covered with clouds on one ſide, and the ſun appears on the other, it is a ſign that theſe dark clouds will diſperſe, and that the ſky will ſoon become ſerene. This is alſo the reaſon why we cannot ſee a rainbow unleſs the ſun is behind us, and the rain oppoſite to us. The ſun and rain muſt appear at the ſame time in order to form a rainbow. No colours would be ſeen if the ſky was too light; therefore, where it appears, the horizon muſt be covered with dark clouds. Neither could the colours in the rainbow exiſt without the refraction of the rays of the ſun upon it.

LESSON LXXXII. TWENTY-EIGHTH WEEK.

THE BIRDS NESTS.

THE conſtruction of the birds neſts diſcovers many curious objects which cannot be indifferent to a reflecting mind deſirous of information. Who is there that would not admire thoſe regular little edifices compoſed of ſo many different materials, collected and put in order with ſo much care and judgment, conſtructed with ſuch induſtry, elegance, and neatneſs, without any other tool than a bill and two claws. It is not ſo wonderful, that men can erect great buildings according to the rules of art, when we conſider, that the artiſts are endowed with reaſon, and have abundance of tools and materials for it. But that a bird, unprovided with any thing for the purpoſe except its bill and claws,

claws, ſhould be capable of uniting ſo much regularity, ſolidity, and judgment, in the conſtruction of its neſt, is what we can never too much admire. Nothing is more wonderful than the neſt of a goldfinch. The inſide of it is lined with cotton, wool, and fine ſilky threads. The outſide is woven with thick moſs, the colour of which reſembles the bark of the tree on which the neſt is laid, in order, that it ſhould be leſs obſerved, and leſs expoſed to the eyes of paſſengers. There are ſome neſts, in which the hair, the down, and the ſtraws, are curiouſly laid acroſs and interwoven. There are others wherein all the parts are neatly joined and tied together with a thread, which the bird makes for itſelf of flax, tow, and horſe hair, and more generally of ſpiders webs. Some birds, for example, the blackbird and lapwing, plaſter over the inſide of their neſt with a thin coat of mortar, which cements and keeps together all the bottom parts; and then while it is freſh, they ſtick ſome moſs to it, in order to make it warm and cloſe. The ſwallows neſt is of a different conſtruction from the reſt. They neither require ſticks, ſtraws, nor ligaments; they know how to compoſe a ſort of cement, with which they make themſelves neſts, perfectly ſecure, neat, and convenient. Their method of moiſtening this cement is by going frequently to dip their breaſts into the water, and then ſhaking it off upon it, till it is thoroughly ſteeped, after which they work it up together with their bills. But the moſt extraordinary of all the neſts are thoſe which certain Indian birds ſuſpend with great art upon the branches of trees, in order to ſecure themſelves from the purſuit of ſeveral animals and inſects. In general, each ſpecies of birds has its particular manner of placing its neſt. Some build them on houſes, others on trees; ſome under the graſs, others in the ground; but all in

the manner beſt adapted for their ſecurity, the bringing up their young, and the preſervation of their ſpecies.

Is it not clear, that in all their work birds propoſe to themſelves certain deſigns? They make the neſt hollow, almoſt like the half of a globe, in order that the heat may the better concentre there. The outſide of the neſt is covered with materials more or leſs coarſe, not only to ſerve as a foundation, but to keep out the wind and the inſects. The inſide is lined with more delicate materials, ſuch as wool and down, to make it ſoft and warm for their young ones to lie on. Is it not a kind of reaſon, which teaches the bird to place its neſt ſo as to be ſheltered from rain, and to be out of the reach of deſtructive animals? Where do they learn they are to have eggs, and that theſe eggs would require neſts to prevent them from falling, and to keep them warm? that the heat would not concentre round the eggs if the neſt was larger, nor hold all the young ones if it was ſmaller? How do they know the proper ſize of the neſt, and the number of young that are to be born? Who teaches them not to miſtake the time, and to calculate ſo exactly, that they never lay their eggs before the neſt is finiſhed? Nothing that has been hitherto ſaid in anſwer to theſe queſtions is ſatisfactory. But of what nature ſoever theſe faculties of the birds may be, they are certainly the effects of a ſuperior power and wiſdom.

LESSON LXXXIII.

REFLECTIONS ON A FLOWER-GARDEN.

SEE and behold the flower-garden, and reflect on the number of different beauties aſſembled together in this little ſpace. The art and induſtry of

of man have made it a beautiful ſcene of the fineſt flowers. But what would it have been without care and culture? A wild deſert full of thiſtles and thorns.—Such would youth be, if not properly educated. But when young people early receive uſeful inſtructions, and are under wiſe direction, they are like lovely bloſſoms, which delight with their beauty, and will ſoon produce fruit beneficial to ſociety. Behold the night violet or the julian flower, which towards evening ſcents our gardens with its perfume, in which it is ſuperior to all others: but it has no beauty. It is ſcarcely like a flower. It is little and of a grey colour, tinged with green, ſo that it can ſcarce be diſtinguiſhed from the leaves. Modeſt, without ſhew or pretenſions, it perfumes the whole garden, although it is not obſerved in the multitude; it is like a perſon who has much ſenſe and whom nature has compenſated for the want of beauty by more ſolid endowments. The righteous man often does good in ſecret, and in obſcurity, and ſheds around him the perfume of good works; and when we wiſh to be acquainted with this beneficent man, we find that there is nothing of diſtinction either in his perſon, condition, or rank.—In the carnation, beauty and perfume are both united; and it is certainly the moſt perfect of all flowers. It almoſt equals the tulip in its colours, and it ſurpaſſes it in the multitude of its leaves, and the elegance of its form. This flower is the emblem of a perſon who poſſeſſes both ſenſe and beauty, and knows how to conciliate the love and reſpect of his fellow-creatures.—Let us now obſerve the roſe, its colour, form, perfume, every thing in this flower charms us. But it appears to be the ſlighteſt and moſt frail of any, and ſoon loſes the beauty which diſtinguiſhes it from other flowers. This is an uſeful leſſon for thoſe who

ſhine only in beauty; and it ought to teach them not to be vain of their charms, or truſt too much to them.

LESSON LXXXIV.

THE ANTS.

THE ants, as well as the bees, may be conſidered as a little commonwealth, which has its peculiar government, laws, and police. They live in a ſort of town, divided into ſeveral ſtreets which lead to different magazines. Their activity and induſtry, in collecting and uſing the materials they require for their neſt, is admirable. They all join in digging the earth together, and in carrying it home. They collect a great quantity of graſs, ſtraw, wood, &c. of which they make a heap. It appears at firſt ſight very irregularly formed; but through all this apparent diſorder, much art may be diſcovered when examined more attentively. Under the domes, or little hills which cover them, and which are always ſo formed as to let the water run off, there are galleries which communicate with one another, and may be conſidered as the ſtreets of this little city. But what is particularly admirable, is the care which the ants take of their eggs, of the worms when they come out of the chryſalis when formed. They convey them carefully from one place to another. They feed their young, and remove, with the tendereſt ſolicitude, every thing that might hurt them. They even attend to preſerving a proper degree of warmth about them. Their painful labours in ſummertime, when heaping up proviſions, have ſcarce any object but the ſupport of their young, as they themſelves require no food in winter, being aſleep

or

or insensible till spring. As soon as their young are out of the egg, they employ themselves in feeding them; and it still costs them more trouble. They generally have several houses, and they convey their young from one habitation to some other which they wish to people. According as the weather is hot or cold, dry or rainy, they bring their chrysalis near the surface of the earth, or remove them from it. They bring them to the surface in mild weather, and even sometimes after rain lay them in a bright sun, or after a long drought in a gentle dew. But at the approach of night, rain, or cold, they take up their little ones in their paws, and carry them so low down into the earth, that it is sometimes necessary to dig above a foot deep in order to find them. There are several sorts of these insects: the wood-ants never lie but in forests or bushes, and do no harm to fields. There are two species of these, the red and the black. Some settle in the ground in dry soils, and generally choose places where they find roots of fir-trees or birch, to make their habitations. Others live on old trunks of trees above ground, high enough to be out of the reach of its moisture. They make themselves apartments in the cavities of the trunk, and cover them with straw and other things, to shelter them from snow or rain. The field-ants are also both black and red as well as the others, but they are smaller. They settle either in the corn or the field. When the weather is dry, they bury themselves pretty deep; but as soon as it becomes rainy, they raise their habitations higher and higher, according as there is more or less damp; and when it abates, they never fail of returning to their subterraneous apartments. It is also to be observed, that the ants acquire wings; and that towards autumn they are seen to fly in swarms over ditches and other water. But are these

mischievous insects worthy our attention, spoiling, as they do, our fields and meadows? By their subterraneous works, they make the ground hollow, tear it up, and prevent the plants and roots from growing. They are reproached more still: they are enemies to the bees and silk-worms; and they are supposed to hurt the flowers, and particularly the young trees. It is said, they devour the buds and shoots; and that getting under the bark of trees, they gnaw them to the quick. For this reason, the ants are destroyed wherever they are found. If the ants gathered honey, though at the expence of a million of other creatures, they would be highly valued; but because their labours hurt some useful plants, we think ourselves authorised to destroy them. Suppose even that in reality they do us some harm, are they therefore less worthy our attention? Do none deserve our observation, but such as are useful to us? Let us banish this prejudice. Even the ants may afford us instruction and amusement. The form of their limbs, their industry, their indefatigable labour, the police of their republic, their tender care of their young, and perhaps a thousand other qualities, which we are not acquainted with, might convince us of the wisdom of that great Being, who is their Creator as well as ours.

LESSON LXXXV. TWENTY-NINTH WEEK.

THE HAIL.

HAIL is nothing but drops of rain, which freezing in the air, fall in pieces of an oblong or angular form. It appears extraordinary, that, in the very warmest seasons of the year, vapours

vapours ſhould freeze in the atmoſphere. We may conſider, that even in the greateſt heats the upper region of the air is cold to a ſenſible degree, and full of ſnow. If it was not ſo, how could the higheſt mountains remain the whole ſummer covered with ſnow. In the hotteſt parts of America, it is ſo ſeverely cold on the higheſt mountains, that there is continual danger of being frozen; and of courſe it would ſnow from this extreme cold in the upper region of the atmoſphere in the very middle of ſummer, if the ſnow did not melt in falling before it reaches the ground. But when theſe particles of ſnow collect together, the drops begin to freeze; and as in falling they go rapidly through warmer regions of the air, it happens, that before this warmth can have penetrated through them, their cold increaſes, ſo as to be entirely frozen. It might be imagined, that the cold, on the contrary, ought to abate in proportion as they paſs through a warmer air. But what is the conſequence in winter, when cold water, which has been expoſed to the outward air, is brought into a very hot room? It freezes and becomes ice, which would not have happened if it had been put into a cold room. This is preciſely the caſe in reſpect to the hail. When cold bodies paſs ſuddenly into hot air, their cold increaſes to ſuch a degree, as to turn to ice. The volatile ſalts, more or leſs diſperſed through our atmoſphere, contribute much to this. We muſt not therefore be ſurpriſed that ſtorms are not always attended with hail, as it requires great abundance of ſaline vapours to occaſion the ſudden freezing of the drops of water. Though hail is more frequent in ſummer-time, it falls alſo in other ſeaſons: for, as in every part of the year the ſaline exhalations may ferment in the atmoſphere, ſo it may hail in winter, autumn, or ſpring. The hailſtones are ſometimes round,

at other times concave, and often angular. The difference we obſerve in the form and ſize of hail-ſtones may proceed from many accidental cauſes. The winds, particularly violent winds that croſs one another, certainly contribute much towards it. A hail-ſtone may alſo in its fall meet ſeveral other cold particles, which conſiderably increaſe its ſize; and often the ſmall hailſtones meet others, and in joining together form into large ones. It is certain, that when the hail is very large it does great miſchief to the vintage and harveſt, fruit, &c. If the violence of a hail-ſtorm ſometimes lays waſte acres of land, this miſchief, however great it may be, is nothing in compariſon of the advantages which accrue from it; the hail evidently cools the air in the burning heats of ſummer; and it is very remarkable, that this apparent diſorder never fails to produce fertility.

Here then, again, we may ſee the goodneſs and wiſdom of Him, who in the midſt of ſtorms worketh admirable things, and never ceaſes to enrich and fertilize the earth.

LESSON LXXXVI.

THE EARTH AND ITS ORIGINAL CONSTITUTION.

THE great Creator has made the earth of a proper nature for the production and growth of herbs, plants, and trees. It is compact enough to contain and hold the vegetables; ſo firm that the wind does not throw them down; and yet it is light and moveable enough for the plants to extend their roots in it, and draw out the moiſture and nutritive juices. And that all ſorts of vegetables ſhould grow and draw ſubſiſtence from the earth, we find it compoſed of ſeveral ſorts of ſoil, which ſerve for other

other purpoſes alſo; ſuch as potter's earth, clay, chalk, and gravel. Some ſerve to make bricks, others to build with, and ſome to make earthen ware. There are alſo kinds of earth which are made uſe of in dying colours, and even in medicine. The unevenneſs of the ground has many advantages: a greater number, and a great variety, of animals and plants, may live on mountains; theſe ſerve to break the violence of the winds; they produce a great variety of wholeſome plants and fruit, which would not do well in plains. They contain in their cavities the minerals and metals ſo uſeful to us: from them proceed the ſprings, and moſt of the rivers produced by the melting of the ſnow, by rain, and other vapours. The ſtones that are under ground ſerve to build walls, to make lime and glaſs. As to the metals, their uſes are numberleſs: let us only think of the many tools our workmen and artiſts require; the utenſils and furniture of every ſort made of them, which furniſh us with ſo many conveniences and ornaments. We alſo draw conſiderable advantages from the hardneſs and weight of thoſe bodies. No body is ignorant of the uſe of minerals. Salt ſerves to ſeaſon our food, and to keep it from corrupting. The ſulphurous particles of bodies render them combuſtible. Even volcanos and earthquakes, whatever miſchief they ſometimes do, are ſtill uſeful and neceſſary. If the fire did not conſume the ſulphurous exhalations, they would ſpread too much in the air, and would make it unwholeſome; many warm baths would not exiſt; and many minerals and metals would never be produced. It is to our ignorance we ſhould impute it, if there are ſo many things of which we do not ſee the uſe. In order to judge of the works of the Lord, and to acknowledge the wiſdom of them, they muſt not be conſidered only in one point of view, but taken in the

whole. Many things we think hurtful, are notwithſtanding certainly of uſe. Others appear ſuperfluous; and yet, if they were wanting, they would leave a void in the plan of the creation. How many things appear to us inſignificant, only becauſe we do not know the real uſe of them! Put a loadſtone into the hands of a man who does not know its virtue, and he will ſcarce deign to look at it: but tell him that we owe to that ſtone the progreſs of navigation, and the diſcovery of a new world, and he will then be of a very different opinion. It is the ſame with reſpect to many things which we deſpiſe, or judge ill of, becauſe we do not know the uſe of them, nor ſee the connexion they have with the whole.

Lord! the earth is full of thy bleſſings; every thing that is upon it or under it. The very duſt is planned with wiſdom!

LESSON LXXXVII.

ON THE PHASES OR APPEARANCES OF THE MOON.

ALL obſervation confirms to us that the moon has a particular motion of turning round the earth from weſt to eaſt: for after having placed itſelf between us and the ſun, it retires from under that body, and continues to go back towards the eaſt, changing from day to day the place of riſing. At the end of fifteen days it will have reached the moſt eaſtern part of the horizon at the time the ſun ſets with us. It is then in oppoſition. In the evening it riſes above our horizon when the ſun retires below it, and it ſets in the morning about the time the ſun riſes. If then it continues to deſcribe the circle which it has half finiſhed round the

the earth, it removes visibly from its point opposite to the sun; it will draw nearer to the sun, and will appear later than when in opposition, till by degrees it will only be seen a little before sun-rise. The revolution of the moon round the earth explains why it rises and sets at such different times, and why its phases are so various, and yet so regular. Every body knows that a globe illuminated by the sun, or by a flambeau, can only receive the light directly on one side. We perceive, at first sight, that the moon is a globe which receives its light from the sun.—When, therefore, it is in conjunction, that is to say, placed between the sun and us, it turns all its illuminated side towards the sun, and its dark side towards us, and is then of course invisible. It rises and sets with the sun in the same region of the sky. This is what we call new moon, or the conjunction. But when the moon retires from under the sun, and goes back towards the east, it has then no longer all its dark side turned towards us: a small part of it, a little border of the lighted half, begins to appear. This illumined border we see on the right side towards sun-set, or even before it. The horns of this crescent turn to the left, or facing the east. The further the moon removes from the sun, the more visible it becomes to us. At the end of seven days, when it has reached a quarter of its course round the earth, it discovers more and more of its illumined side, till it shews us half of it. The light part is then turned towards the sun, and the dark part casts no light on us. Exactly half the moon is then illuminated. The half of that half can only be the quarter of the whole globe, and it is in reality this quarter which appears to us. The moon is then in its first quarter. By degrees, as the moon removes from the sun, and as the earth comes between them, the more of that part of the

moon

moon which faces us becomes light. At the end of ſeven days, reckoning from the firſt quarter, it is almoſt directly oppoſite to the ſun, and then its whole illumined diſk preſents itſelf to us. It then riſes in the eaſt exactly at the moment the ſun ſets in the weſt, and we have a full moon. Next day the lighted half, is already a little turned from us, and we no longer ſee it at all. The light gradually leaves the weſtern ſide, extending itſelf in proportion on the half not facing the earth. This is the decreaſe of the moon, and the more it goes forward, the more the dark ſide increaſes, till at laſt half the dark ſide is turned towards the earth, and conſequently half the light ſide. It has then the form of half a circle, and is what we call the laſt quarter.

By the admirable harmony which ſubſiſts between the motion of this planet on its own axis, and its courſe round the ſun, it ſo happens, that the moon ſtill ſhews us the ſame half a globe which it has ſhewn ſince the beginning of the world. During ſo many thouſands of years, this globe has conſtantly, and without deviating from the ſame courſe, finiſhed its revolution in 27 days and eight hours. Regularly, and at the ſame periods, it has lighted ſometimes our nights, and ſometimes thoſe of remote countries. With how much goodneſs has it pleaſed Divine Wiſdom to grant to our earth a faithful companion to light almoſt half our nights! Alas! we are not properly ſenſible of the value of this wiſe plan of the Creator.

LESSON

LESSON LXXXVIII. THIRTIETH WEEK.

MINERAL WATERS.

WHETHER we consider mineral waters in respect to their formation, or the benefit that accrues to us from them, they are certainly valuable blessings bestowed upon us. But even the places where these salutary springs flow are seldom what they ought to be, places consecrated to praise and gratitude towards Heaven. Let the following reflections make us more grateful to our Heavenly Benefactor: in the first place, are not the springs from whence we draw the common salt to season our food, worthy our attention? It is probable that these springs originate from the mineral salt, which the waters dissolve under ground. The mineral hot baths are not less remarkable: there is not only so great a number of them, that in Germany alone they reckon about six score, but they are also so hot, that it is necessary to let the water cool for twelve, and sometimes eighteen hours, before they are fit to bathe in. What is the cause of this extraordinary heat? It certainly is not the sun; for if it were, the waters would only preserve their heat in the day-time when the sun shines, and they would grow cold in the night or in winter. Neither can it be attributed to subterraneous fires; for then it would still be necessary to account for the medicinal virtue of these baths. The most simple cause we can give is this, that the waters passing through ground, mixed with sulphur, fire-stones, and metals, acquire this degree of heat. When the water falls on those quarries, the sulphurous and ferruginous particles which it dissolves, heat and take fire by the friction and reaction

action of their principles, and communicate this heat to the water. Medicinal waters, particularly the acids, are produced by the diſſolving and mixing with the minerals they waſh away. They are found particularly in places where there is abundance of iron, copper, ſulphur, or charcoal. This is the reaſon there is ſuch difference both in the effect and taſte of them, in proportion as they are more or leſs mixed with theſe. They are bitter when they are produced by bitter roots, ſaltpetre, or copper. They are cold when they come out of rocks, or are impregnated with ſal-ammoniac, ſaltpetre, alum, &c. Oily and bituminous ſubſtances make them oleaginous; brimſtone mixed with acids makes them ſulphurous.

Let us admire the Divine Goodneſs which has prepared for man thoſe ſalutary and inexhauſtible ſprings. Mineral waters may certainly anſwer many other purpoſes; but it cannot be doubted they were alſo produced for the preſervation of the health of mankind. It is for man that the Lord has made theſe beneficent waters ſpring up. Let us then acknowledge his goodneſs, and be ſenſibly touched with it. Thoſe particularly who experience their ſtrengthening and ſalutary virtue, let their ſouls, penetrated with joy and gratitude, be lifted up to their Heavenly Father. Let them glorify him, by imitating his example; and let their riches be ſources of life and conſolation to their fellow-creatures in neceſſity.

LESSON LXXXIX.

THE BEAUTY AND USE OF MEADOWS AND FIELDS.

THE ſight of a large beautiful garden in ſummer gives us a lively pleaſure, which our apartments do not afford, of which we can form no

no idea. But even the pleafure we feel from the fineft garden is not to be compared to that of walking in fields and meadows. The ftately tulip, the elegant narciffus, the beautiful hyacinth, none pleafe fo much as the fimple flowers which enamel the fertile valley. Whatever charms the flowers may have which are cultivated in our gardens, thofe in the fields are ftill more pleafing. There is beauty in the former, but in the latter there is both ufe and beauty. Mere ufelefs beauty pleafes for a moment only. Is it not true, that in thofe long gravel walks, fo even and neat, thofe arbours and fummer-houfes, thofe parterres, thofe walls, thofe enclofures; is it not true that we feel confined, and as if oppreffed in them? All thofe places, where the view is confined, feem to fet bounds to our liberty.—We feem in fome degree to be more independent, and more at eafe, in proportion as our walk enlarges and lengthens before us. In the country, in fummer, nature, fruitful and beautiful, varies every moment its appearance; whereas, in our ornamental gardens, we continually behold the fame objects. Even their order and regularity prevent us from being long pleafed with them. They have nothing new to offer us, and we tire of them. The eye, on the contrary, wanders with pleafure over objects continually diverfified, and extending as far as the fight can reach. It was in order to give us this enjoyment, that in moft places the ground was formed fmooth and even; but to the end that we might alfo have pleafing diftant profpects, our horizon is furrounded with rifing hills. Nature has done ftill more: it has fpared us the trouble of cultivating thofe flowery meads, or of watering them. An innumerable multitude of feeds are fown in them, which produce a verdure fcarce ever interrupted, or which is at leaft eafily renewed.

newed. This prodigious variety of plants with which a field is covered, is not for the ſight only; they have each a ſeed, a bloſſom, qualities, and beauties, peculiar to themſelves. It is true, that the ſame ſpecies of herbs is prodigiouſly multiplied in each field; but perhaps we ſcarcely make two ſteps without treading on an hundred different ſorts, each of which has its peculiar uſe. To the pleaſure fields afford us, our beneficent Creator has added conſiderable advantages. They produce plants for our food, and a great number of ſimples, which ſerve for medicine. The ox, and the horſe, whoſe ſervices are innumerable, demand no other recompence for their toil, than the free uſe of the field, or a ſufficient quantity of hay. The cow, whoſe milk is one of the great ſupports of our life, aſks nothing more. The field is the moſt complete inheritance: its produce is certain, and requires neither ſowing nor labour. It only coſts the ſlight trouble of gathering what it yields. We look upon graſs with contempt or indifference, perhaps becauſe it grows under our feet, and has not been made the object of our care and culture. But whatever may be the cauſe of our indifference, it is certainly quite inexcuſable. Surely, the ſight of our meadows enamelled with flowers, ſhould fill us with admiration of the goodneſs of the Creator, who, with a bountiful hand, pours out abundance for men and animals; his mercy is every where, and there is not a corner of the earth where we may not diſcover traces of his good providence! Yes, every country, every ſoil, the ſandy and the marſhy, the gravelly and the clayey, all equally proclaim the beneficence of the Preſerver of the univerſe.

LESSON

LESSON XC.

THE TWILIGHT.

IT cannot be doubted that this phenomenon which we daily behold is equally with the reſt deſigned for our benefit. The twilight is nothing more than a prolongation of day; which prepares our eyes ſometimes to bear the full light, and at other times the darkneſs of the night. But twilights are not always the ſame; they vary according to ſeaſons and climates. Toward the poles they laſt longer than in the torrid zone. The people of that zone behold the ſun riſe directly above their horizon, and ſink down in the ſame direction under the lower hemiſphere; by which means they are left all at once in total darkneſs. On the contrary, the ſun reflecting its rays obliquely towards the poles, and not ſinking much below the horizon of the neighbouring people, their nights, though long, are almoſt all along attended with twilight; therefore not dark. It is an happineſs for the former to have ſcarce any twilight, and for the others to have an almoſt conſtant dawn. As for us, who are placed nearly at an equal diſtance from the torrid and frigid zone, we plainly obſerve that our twilights become ſhorter in proportion as the days ſhorten; and that they increaſe as the days lengthen. We enjoy day-light an hour and more after the ſun has ſet. The twilight is equally long before the ſun riſes above the horizon. We owe this uſeful circumſtance to the properties of the air. God hath ſurrounded the earth with an atmoſphere, which riſes very high. He formed ſuch proportion between this air and the light which comes upon it, that when it enters directly down into it, nothing can obſtruct

obſtruct its courſe; but when a ray enters ſideways, or obliquely into this air, the ray, inſtead of paſſing through the air in a direct line, bends or deſcends a little lower; ſo that moſt of the rays which pierce the atmoſphere along ſide of the earth, fall again by means of this inflection upon the earth. Inſtead of following their courſe in paſſing by the ſide, they are bent by the air, and directed towards the earth. Thus, when the ſun approaches our horizon, many of its rays which paſs by us, and are not ſent towards us, meet the maſs of air which ſurrounds us, and bending in that maſs they reach our eyes; ſo that we ſee day-light long before the ſun itſelf appears. This refraction of light in the body of air which ſurrounds us, is a work equally full of wiſdom and goodneſs for all the people of the earth; but it is a particular bleſſing to thoſe who inhabit the frigid zones. They would be plunged in frightful darkneſs for ſeveral months together, if they had no twilight. Perhaps this explanation of the origin of twilights may not be intelligible to every reader, but let us leave to philoſophers a further detail of it, and let us limit ourſelves to the reflecting on it as reaſonable beings. The honeſt, though ignorant Chriſtian, may poſſibly be wiſer than many philoſophers; who, while they explain and calculate the twilights, loſe ſight of that great Being who gives to man the light of day.

LESSON XCI. THIRTY-FIRST WEEK.

DIFFERENCE OF ZONES.

THE Creator having made our earth in the form of a globe, and having impreſſed upon it a double motion, it neceſſarily followed, that the

the regions of the earth muſt be different from each other; not only in reſpect to the temperature of the air, and the ſeaſons, but to the animals and plants alſo. In certain countries there is but one ſeaſon; the ſummer is continual there, and every day is as hot as our ſummer days. Thoſe countries are ſituated in the middle of the globe, and occupy the ſpace called the Torrid Zone. The fineſt and richeſt fruits which nature produces grow there; and it is there in general where ſhe moſt liberally pours forth her treaſures. The days and nights are of equal length moſt of the year. There are, on the contrary, countries, where during the greateſt part of the year it is colder than our ſevereſt winters. It is but a few weeks in the year warm enough for the few trees and herbs which are there, to grow or become green; and in thoſe frigid zones, neither the trees nor the earth produce fruit which mankind could feed on. The greateſt inequality of day and night is there: each of them laſt in their turn for whole months together. The two temperate zones placed between the torrid and the frozen, occupy the greateſt part of our globe. In thoſe countries, four ſeaſons appear more or leſs diſtinctly, according as they approach the torrid, or the frigid zones. The *ſpring*, wherein the trees and plants bud and bloſſom, the heat is moderate, and the days and nights nearly equal. The *ſummer*, during which the fruit of the field and trees ripen, when the heat is more intenſe, and the days become viſibly longer than the nights. The *autumn*, when the fruit and the ſeeds fall off, and the graſs withers, while the night again becomes equal with the day, and the heat is daily abating. The *winter*, during which the vegetation of plants totally or partly ceaſes, the nights lengthen, and the cold more or leſs increaſes. The countries of the temperate zones, are ſo ſituated, that

that in thoſe which are near one of the ſides of the torrid zone, the ſeaſons are directly contrary to thoſe of the other temperate zone. When it is ſummer in one, it is winter in the other, &c. In theſe parts, nature ſhews more variety in the produce of the earth, and in animals, than elſewhere.—Wine is peculiar to theſe countries; for the vine cannot be cultivated, either in intenſely hot, or ſeverely cold climates. Mankind in particular have advantages under ſuch climates. However varied the regions of our earth may be, the Creator has provided for the happineſs of all who inhabit them. He ordains that each country ſhould produce what is moſt requiſite, according to the nature of the climate. A worm, which feeds on the leaves of the mulberry-tree, ſpins for the people of the torrid zone a web, from which they take ſilk for their clothing. A tree, as well as a ſhrub, bears a kind of huſk or ſhell full of fine cotton wool, with which light cloths are eaſily made. On the other hand, the cold regions abound in quadrupedes; the ſkins of which ſerve for clothing to the inhabitants of the north; and they are furniſhed with thick foreſts, which ſupply them with abundance of fuel. That the blood of the inhabitants of the warm climates naturally heated, may not be too much inflamed, their fields and orchards give them cooling fruits, in ſuch plenty, that they may ſend ample proviſion of them to other countries. In cold climates, the great quantity of fiſh contained in the ſea and lakes, and the number of animals they have, ſupply the place of fruit. Thus, there is no region in our globe, that does not feel the greatneſs and goodneſs of the Almighty. There is no country, however barren and poor we may ſuppoſe it, where nature is not bountiful enough to provide, not only the neceſſaries, but the comforts of life.

LESSON

LESSON LCII.

SINGULARITIES OF THE SEA.

THE ſea is generally conſidered only in a terrible light, without reflecting on the wonders and bleſſings it ſo viſibly preſents to us. It is certainly true, that the ſea is one of the moſt dreadful elements when the tempeſt roars, its waves ſwell mountains high, and ſhips are driven by them on banks of ſand or rocks, where they are daſhed to pieces. The whirlpools, or thoſe maſſes of water which make the ſhip turn rapidly round with their current, and end in ſinking or ſwallowing them up; thoſe whirpools are occaſioned by great cavities in the ſea, where rocks and different currents meet. No leſs dangerous are the water-ſpouts, which the wind raiſes from the ſea up to the ſky. They hover in the air above the ocean, and the wind whirls them round with violence; they often burſt with great noiſe, and do much miſchief to veſſels at ſea; they frequently break the maſts, tear the ſails, and ſink the ſhip. But we ſhould be very ungrateful to attend only to the miſchief the ſea does us, without deigning to reflect on the magnificent works of the Lord, and on his goodneſs, which ſhines forth even in the depths of the abyſs. The firſt thing worthy of remark is the ſaltneſs of the ſea. It is ſuch, that a pound of water contains two ounces of ſalt. This ſalt quality, be the cauſe of it what it may, was neceſſary for ſeveral purpoſes. It prevents the water from corrupting, and contributes to make it ſtrong enough to bear the greateſt burdens to be conveyed from one place to another. The colour alſo of the ſea-water deſerves our obſervation; it is not the ſame every where. The different inſects,

marine

marine plants, the mixture of many things which the rivers wash into the sea, vary its colour here and there. When it is calm, it sometimes appears strewed with brilliant stars. The tract of a ship, which cuts the waves, is often luminous, and seems a river of fire. These phenomena must be partly attributed to sulphurous particles, oily and inflammable substances in the sea, and partly to shining insects. Every day, or rather in the space of 25 hours, the sea twice rises and falls. When the tide rises, it is the flux; and when it falls it is the reflux. This phenomenon is attended with several remarkable circumstances. There is always a flux and reflux at the same time in two parts of the globe, and those are opposite to each other. The tide is always lowest when we are in the first and last quarter of the moon; and our highest tides are generally three days after the new or full moon. However it may proceed from accidental causes, that the tide is sooner and higher one time than another; it is still certain, that great advantages result to us from it, both in purifying the water, and being useful for navigation. — And wonderful as this is, there is much more to interest us. If we consider the contents of the sea, a new world appears; and the number of beings of which it is composed is prodigious. The aquatic animals are not indeed so varied in their species as the terrestrial; but they surpass them in size, and their life is longer than that of the earth or air. The elephant and ostrich are small in comparison of the whale, which is the largest fish the sea contains. Its length is often from 60 to 70 feet. It lives as long as an oak, and consequently no land animal's life can be compared to it. Who could even give a list of the several sorts of animals which live at the bottom, and towards the surface of the sea? Who could tell their number, describe their

their form, conſtruction, ſize, and uſe of theſe different animals? The ocean and ſeas appear to occupy about two-thirds of our globe. The ſeas are not only great reſervoirs of water, but alſo, by means of vapours which ariſe out of them, ſources of rain, ſnow, and other ſuch meteors. How much wiſdom there appears in the connexion the ſeas have with each other, and the continual motion the Creator has impreſſed upon them! There are found in the ſea, rocks, valleys, caves, plains, ſprings, rivers, plants, and animals. The iſlands in the ſea are only the tops of a long chain of mountains. And when we conſider, that the ſea has been leſs examined than any other part of the globe, we have reaſon to believe, that it contains ſtill a number of wonders, to which neither the underſtanding nor the ſenſes of man are adequate; but which all prove the power and wiſdom of God. Let us then adore him who has every where, in the ocean, as well as upon earth, fixed monuments of his greatneſs.

LESSON XCIII.

SEVERAL THINGS REMARKABLE IN ANIMALS.

THE different inſtincts and properties of animals are a very intereſting ſtudy. But, to a reflecting being, it is ſomething more than merely an agreeable object. The animal operations teach him to trace them back to a wiſdom he cannot fathom, becauſe it ſurpaſſes all human conception. This is the effect I wiſh to produce, by pointing out the ſingularities obſervable in certain animals. The manner in which birds and inſects lay their eggs is worth remarking. The grathopper, the lizard, the tortoiſe, and crocodile, never trouble

themſelves about their eggs, nor the young ones that are in them. They lay their eggs in the earth, and leave to the ſun the care of hatching them. Other animals, by a natural inſtinct, lay their eggs in places where the young find food the moment they are born. The mothers are never miſtaken. The butterfly, proceeding from the caterpillar, will not lay its eggs on meat, nor will the fly which lives on meat, lay her's on cabbage.—Certain animals are ſo careful of their eggs, that they carry them with them wherever they go. The ſpider, called the *wanderer*, carries her's in a little ſilken bag. When they are hatched, they range themſelves in a particular order on their mother's back, who goes about with this load, and continues to take care of them for ſome time. Certain flies lay their eggs in the bodies of living inſects, or in the neſts of thoſe inſects. It is well known, that there is not a plant which does not ſerve to feed and lodge many inſects. A fly pierces through an oak-leaf, and lays an egg in the hole it has made. This wound quickly cloſes. The place it was in ſwells, and there ſoon appears upon it an excreſcence, which they call the gall-nut. The egg that was contained in the growing gall-nut grows with it, and the inſect finds both lodging and food as ſoon as it is born. The care of animals for their young is ſcarce credible; and their love of them ſometimes ſurpaſſes their love of life. With what tenderneſs the quadrupedes nurſe their young! They cure their wounds by licking them; they convey them from one place to another, when any danger threatens; they guide them and defend them. What pains the mothers take to get them meat! The ſea-dog, during a ſtorm, conceals its young under its ſtomach; whence they come out again when the fright is over. Each ſpecies of animals has its peculiar inclinations and wants. Let us, for example,

ample, conſider thoſe which are obliged to ſeek their food in the water, and particularly the aquatic birds. Nature has covered their wings with a gluey oil, through which the water cannot penetrate; by this means they are not wet in diving, which otherwiſe would prevent their flying. The proportion alſo of their bodies differs from that of other birds. Their legs are placed more behind, that they may ſtand up in the water, and ſtretch their wings above it. To enable them to ſwim, their feet are furniſhed with webs. For the purpoſe of diving, they have been given a particular form of body; and for that of ſeizing their prey, nature has provided them with large bills and long necks. In a word, they are formed as their way of life requires they ſhould be. The nautilus is a ſort of ſhell-fiſh, ſomething like a ſnail. When it wiſhes to aſcend, it places itſelf on the fore-part of its ſhell; and to make itſelf lighter, it throws out the water. If it wiſhes to deſcend, it withdraws into the bottom of its houſe, which then fills with water, and becomes heavy. If it wiſhes to ſail, it artfully turns its ſhell, which becomes a little gondola, and then it ſtretches out a thin ſlight membrane, which ſwells in the wind, and ſerves as a ſail. Perhaps, from the nautilus mankind have learned the art of navigation.

It is with the actions of animals as with their make. The ſame wiſdom which formed their bodies, their limbs, and appointed them a common uſe, has alſo planned the different actions we ſee them perform, and directs them towards that purpoſe for which they were created. When, therefore, I obſerve the inſtinct and the induſtry of animals, I feel a ſentiment of veneration, gratitude, and reſpect, for their Creator.

LESSON XCIV. THIRTY-SECOND WEEK.

ON THE GRAVITY OF BODIES.

BODIES are endowed with force, which acts at all times, in all places, and in all ſenſes. If a body endeavours to move towards one point more forcibly than to another, we ſay that it gravitates towards that point. For experience teaches us, that bodies are inclined to deſcend; or, that if they are far from the ſurface of the earth without ſupport, they fall on it in a perpendicular line. It is by no means in the body itſelf that we muſt ſeek the cauſe of its weight; for a body which falls remains in the ſtate it was put, till ſome exterior cauſe changes it. It is equally impoſſible that the air ſhould occaſion this gravity, ſince being itſelf heavy, it ought rather to leſſen the ſwiftneſs of the fall of bodies; we muſt therefore ſeek the cauſe elſewhere. Perhaps the opinion neareſt truth, is that which ſuppoſes the earth to have the virtue of attracting bodies placed at a certain diſtance, as the magnet attracts iron: or elſe, poſſibly, it may be imputed to a foreign ſubſtance diſtributed throughout all bodies. But though we cannot poſitively aſcertain the cauſe of weight, nothing is more evident than the advantages which accrue from it. Without it we ſhould not be able to move as we do. When we raiſe the right foot, we make the left to be the centre of gravity. If we then bend our body forward, we are near falling; but by putting out the right foot, we prevent the fall, and make a ſtep. Thus our walk is, in ſome reſpects, a continual courſe of falls; during which the centre of gravity is preſerved between our feet. This is the reaſon we bend forward in going up a hill, and backward

backward in coming down it. We alſo lean forward when we carry a load on our ſhoulders, and backward when we carry it before us. All this is according to the laws of gravity, which govern the motions of animals when they walk, ſwim, or fly. Theſe ſame laws govern the motions of the immenſe bodies which roll in the firmament: the ſun attracts the planets; and each planet in its turn attracts its ſatellites: or, what is juſt the ſame, the planets gravitate towards the ſun, and the ſatellites towards the planets; for a body made to turn round always, flies in a direct line from its centre, if it meets with no obſtacle in its way. It is with the greateſt ſwiftneſs that the planets run their courſe; and the moon is not faſtened by a chain to our earth. It ſeems then, as if a motion ſo rapid as that of the moon, muſt throw it very far from us in the immeaſurable ſpace, if there was not a force which continually puſhes it towards our globe; and which counteracts the force that removes it from hence. That firſt force is the gravitation of the moon towards the earth. If our earth was either lighter or heavier than it is, what would be the conſequence? It would either draw too near or too far from the ſun. In the firſt caſe, the heat would be inſupportable; and in the latter, the cold would be equally ſo: every thing in our globe would be conſumed or frozen. What would then become of the ſeaſons, and many things ſo indiſpenſable for man, and ſo neceſſary for his happineſs?

Here again, then, O Supreme Wiſdom! I find a monument of thy wonders. By the laws of gravity thou giveſt motion to the celeſtial bodies, and to all animals. But it is in this that the greatneſs of thy power and wiſdom conſiſts, and that the greateſt effects are produced by means that appear to us the moſt inſignificant.

LESSON XCV.

THE NUMBER OF EFFECTS IN NATURE.

THE whole conſtitution of the world may convince us, that it is not chance, but a divine power, and a wiſdom beyond all conception, which firſt erected this wonderful fabric, and impreſſed motion upon its different parts, and regulated the great chain of events depending on and ſucceeding each other. What variety of effects does the heat of the ſun viſibly produce? It not only contributes to preſerve the life of multitudes of animals, but alſo to the vegetation of plants, the ripening of corn and fruit, the fluidity of water, the exhalation of vapours, and formation of clouds, without which neither rain nor dew would fall upon the earth. The air, likewiſe, is ſo conſtituted as to fulfil ſeveral purpoſes at once. By means of this element, the animal bodies are preſerved, and all the vital motions acquire force. It is the air which kindles fire, and nouriſhes the flame. The air, by its motion and undulation, conveys every ſort of ſound to the ear. It gives a ſpring to the winged animals; and enables them to fly from place to place. It opens to man an eaſy paſſage through the ſeas; the vaſt expanſe of which he could not otherwiſe croſs over. It is the air which ſupports the clouds in the atmoſphere, till becoming too heavy, they fall again in rain. It is the air which prolongs the day by the twilights; and without it, the gift of ſpeech, and the ſenſe of hearing, would be uſeleſs to us. All theſe bleſſings, and many more, depend on the formation of the air in which we live and breathe. This wonderful element which ſurrounds our globe, which is too ſubtile to be viſible to us, and yet ſo ſtrong, that no element

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can refist its force, is it not a striking proof of the wisdom of our Creator? The force of gravitation alone, which exists in every thing, holds the earth firm, preserves the mountains, and renders water fluid. It confines the ocean in its depths, and the earth within the circle prescribed. It maintains each being in its place throughout all nature; and preserves between the celestial bodies the proper distance from each other. Who can describe the many properties of water! In general, it serves to dilute, to soften, to mix a great many bodies which we could not otherwise make use of. It is the most wholesome drink: it is the best nourishment for plants: it works mills and several other machines. It procures us fish, and brings on its surface the treasures of other regions. How various and innumerable the effects produced by fire! Solid bodies are either melted and made fluid, or become again solid bodies of a different sort. It makes fluids boil, or reduces them to a vapour; and gives heat to all other bodies, and contributes to give sensation of sight to living creatures.

It is not only in the natural world that we see the greatest variety of effects produced by the same cause: in the moral world also, one single disposition of the mind produces no less variety of effects. Let us, for example, consider the natural inclination we have to love one another. From hence is derived the care of parents for their children; social ties; the connexion of friendship; goodness in those who govern, and fidelity in those who obey. Thus, one single propensity keeps each individual in the circle prescribed, and forms the bond of human society; is the principle of all virtuous actions, of all laudable pursuits, and of all innocent enjoyments.

LESSON XCVI.

VARIETY IN THE STATURE OF MAN.

THE entire height of the human body varies considerably, and the more or the less is of little consequence. The usual height is from five to six feet. Some people, who live in the northern countries along the frozen seas, are less than five feet. The least people of those known to us inhabit the top of the mountains in the island of Madagascar; they are scarce four feet high. Many of these dwarfish people came originally from nations of a common stature; and the cause of their degeneracy must certainly be imputed to the climate they inhabit. The extreme cold most of the year there, makes both animals and vegetables small; why should it not have the same effect on man? On the other hand, there are whole nations of a gigantic size: the most famous of them are the Patagonians, who live near the straights of Magellan. It is asserted that they are from eight to ten feet high. Neither ought it to appear to us impossible, that there should be people taller than the Europeans. Besides the traces that remain of it in history, and in the monuments of antiquity, there have been seen, even in our climates, men sometimes above six feet and a half high; who were, notwithstanding, well proportioned, healthy, and capable of all the exercise and labour which require strength and activity.

Adorable Creator! every thing bears thy stamp: the dwarf as well as the giant; the blade of grass as well as the oak; the worm as well as the elephant.

LESSON

LESSON XCVII. THIRTY-THIRD WEEK.

THE DOG-DAYS.

THE ſun, beſides its diurnal motion, which appears to convey it from eaſt to weſt, and which occaſions the revolution of day and night, ſeeems evidently to have another motion from weſt to eaſt; by means of which, at the end of 365 days, it comes again near the ſame ſtars from which it had removed for ſix months, and to which it was drawing near the other ſix months. On this account, the ancient aſtronomers divided the ſeaſons according to the ſtars which the ſun meets in its annual courſe They divided this courſe into twelve conſtellations, which are the twelve ſigns of the Zodiac, called the twelve houſes of the ſun, becauſe it ſeems to dwell a month in each of them. The ſummer begins with us when the ſun enters the ſign of Cancer, which happens the 21ſt or 22d of June. It is then that the ſun is raiſed at the higheſt above our horizon, and darts its rays almoſt directly upon us; and of courſe at that time begins the heat of ſummer, which always increaſes in the following month, by degrees, as our globe is more heated by the burning rays of the ſun. This is the reaſon that for a month or ſix weeks after Midſummer is generally the hotteſt part of the year. Now, of all the ſtars in conjunction with the ſun, the dog-ſtar is the brighteſt; loſt in the rays of the ſun, it diſappears from us for a month, as is the caſe with every ſtar which the ſun meets in its courſe, and the month of its diſappearing is the time called the dog-days. Theſe obſervations would be of little importance, were it not to remove a rooted prejudice among many people. An

ancient tradition attributes the heat uſually felt at this time to the influence of the dog-ſtar upon the earth and its inhabitants. This opinion is proved to be abſurd, from this circumſtance alone, that the concealment of the dog-ſtar, in the rays of the ſun, does not take place in the time we call dog-days. Thoſe days, properly ſpeaking, do not in reality begin till one month after, and they terminate towards the end of the next month.—When, therefore, in the ſuppoſed dog-days, things liable to ferment turn ſour; when ſtagnated waters dry up as well as the ſprings; when dogs and other animals are ſeized with madneſs; when we are attacked with diſorders, which imprudence in hot weather draws upon us: this does not happen becauſe a ſtar conceals itſelf behind the ſun; it is the extreme heat of the air, at that ſeaſon, which is the ſole cauſe of all thoſe effects. Whoever can ſuppoſe, that certain figures, which the imagination forms to itſelf in the ſky, can have any influence on our globe, and on the health and reaſon of man, diſcovers great want of judgment. It is not the ſtars, it is generally ourſelves, which we ought to accuſe of the evils we ſuffer. Can we ſuppoſe an infinitely good Being, the Ruler of the world, to have created any thing in the heavens or in the earth, to be a torment and miſery to his creatures? If we believe in ſuch as an inevitable fatality, we cannot admit or acknowledge a Creator, the eſſence of wiſdom and goodneſs. Inſtead of being guilty of ſuch an error, let us glorify God, and ſecure our peace, by believing ourſelves to be under the protection of a merciful Father, contrary to whoſe will not even a hair can fall from our heads.

LESSON

LESSON XCVIII.

CONTEMPLATION OF A MEADOW.

DARK and majeſtic woods, where the fir-tree raiſes its ſtately head, where the tufted oaks ſpread their ſhade: ye rivers which roll your ſilver waves through the grey mountains, it is not you I now mean to praiſe; it is the verdure and enamel of the fields which are now the objects of my contemplation. How many beauties preſent themſelves to the ſight, and how varied are they! Millions of vegetables, millions of live creatures! Some flying from flower to flower, while others creep and crawl in the dark labyrinths of the tufted graſs. How ſoft the murmur of the limpid ſtream, whoſe banks are covered with thick graſs, intermixed with flowers, which, bending over the water, trace their image in it. Behold that foreſt of waving herbs! What a mild luſtre the ſun caſts on thoſe different ſhades of green. Thoſe delicate plants, interwoven with graſs, thus mix their tender foliage; or elſe proudly raiſe their heads above their companions, and diſplay flowers without perfume; whilſt the humble violet grows on barren hills, exhaling its ſweets around. Thus one often ſees the uſeful virtuous man in poverty, whilſt the rich and great are clothed in ſumptuous habits, waſting in idleneſs the bleſſings of the earth. Winged inſects purſue each other in the graſs. Sometimes I loſe ſight of them in the verdure, and then again I ſee a ſwarm of them flying in the air, and ſporting in the rays of the ſun. What other buzzing is this I hear? It is a ſwarm of young bees. They have lately flown from their diſtant home, and diſperſed over the gardens and fields. They are now gathering ſweet nectar from the

flowers, in order to carry it to their cells. There is not an idle one amongst them. They fly from flower to flower; and, in seeking their stores, they conceal their velvet heads in the cup of the flower, or else with labour penetrate into those that are not yet unfolded. O how beautiful is nature! The grass and flowers grow luxurious; the trees are covered with foliage; the gentle zephyr salutes us; the flocks seek their pasture; the tender bleating lambs skip and rejoice in their existence; innumerable blades of grass rise up in this field, and to each point hangs a drop of dew. How many primroses with their trembling leaves are here! What harmony in the notes of various birds from yonder hill! Every thing expresses joy. It reigns in the hills and dales, in woods and in groves. Happy he whose innocent life passes away in performing his duty to his Maker, and in the enjoyment of the beauties of nature! The whole creation smiles upon him, and joy attends him wherever he goes; his mind is serene as a calm summer-day; his affections are gentle and pure as the perfume of the flowers around him. Happy he who in the beauties of nature traces the Creator, and devotes himself wholly to him!

LESSON XCIX.

VORACIOUS ANIMALS AND INSECTS.

IT is easier to exterminate wolves, lions, and other wild beasts, than to extirpate insects, when they swarm over a whole country. At Peru, a sort of ant called *chako* is very injurious to the inhabitants. Their lives would even be in danger, if they did not use precautions to deliver themselves from these dreadful insects. It is well known what caterpillars do to fruit-trees, and mice

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to the fields. But however real these inconveniences may be, they do not authorise such bitter complaints as we allow ourselves to make; complaints in which self-love has too great a part.—We are pleased at observing that the creatures hurtful to us destroy one another. We think we have a right to take away the lives of animals, either for our food, or for any other purpose; but cannot bear that they should take any thing from us. We expect they should serve for our subsistence, and will give up nothing to them. In reality, however, have we more right over the life of a gnat, than it has to a drop of our blood? Besides, in complaining of the voracity of animals, we do not consider that this plan of nature is not as disadvantageous as it appears. In order to be convinced of this, we have only to consider the animal kingdom in the whole. Such species which appear noxious to us is, however, of real use; and it would be very dangerous to attempt to destroy the race of them. A few years ago, some inhabitants of the English colonies in America endeavoured to extirpate the jays, or jackdaws, because they fancied that these birds did much mischief to the corn; but in proportion as the number of jays diminished, the people were struck with the havock made by an enormous multitude of worms, caterpillars, and particularly the May-bugs. They soon ceased to persecute the jays; and as soon as those multiplied again, they put an end to this plague which had been the consequence of their destruction. Some time ago a project was formed in Sweden to destroy the crows; but they were observed in time, not only to fix on corn and plants, but also that they devoured the worms and caterpillars, which destroy the leaves or roots of vegetables. In North America they pursued the sparrow violently; but it happened from thence, that the

the gnats increaſed to ſuch a degree in the marſhy countries, that they were obliged to leave a great deal of land uncultivated. Pheaſant-hunting is ſo conſiderable in the iſle of Porcida, that it occaſioned the king of Naples to forbid the uſe of cats to the inhabitants. At the end of a few years the rats and mice increaſed ſo much, and did ſuch miſchief that this order was aboliſhed. And why ſhould we be ſo ſelfiſh as to envy creatures the ſmall part of our proviſions which they require for food? Could we poſſibly conſume all that nature produces? Shall we want any thing for our ſupport or pleaſure, becauſe the birds, the mice, and the inſects, help us to make uſe of the bleſſings which God grants in ſuch profuſion, and part of which would be waſted, were not the animals to feed on it. Inſtead of giving way to unjuſt complaints, let us rather in this acknowledge the wiſdom of our Creator. Every thing in nature is connected togegether; and we may be certain that it is for the wiſeſt purpoſes that they exiſt.

LESSON C. THIRTY-FOURTH WEEK.

THE BUILDINGS OF THE BEAVERS.

IF a man, who had never heard of the beavers manner of building, had been ſhewn ſome of their edifices, he would certainly have ſuppoſed them the work of ſkilful architects. The whole performance of theſe amphibious creatures is wonderful, and muſt fill every attentive obſerver with aſtoniſhment. The beavers chooſe a place to build on where they can have plenty of proviſions, and near a rivulet, in order to have a reſervoir of water to bathe in. They begin by making a dike or bank, which keeps the water on a level with the firſt floor of their houſe. This bank is ſometimes a prodi-

gious

gious work. It is about ten or twelve feet thick at bottom. It goes ſloping, and inſenſibly diminiſhing towards the top, till it becomes no more than two feet. The only materials for this dike are wood and clay. The beavers cut through pieces of wood, as thick as an arm, with wonderful eaſe. They fix theſe into the ground, very cloſe to each other, and interweave between ſmaller and more ſupple pieces of wood. But as the water would get through, and their watering-place would be empty, they have recourſe to clay, which they know where to find, and with which they fill all the ſpaces within and without, ſo that the water cannot run through. In proportion as the water riſes, they continue to raiſe the dike. The bank of the watering-place being finiſhed, they labour at their houſes, which are round or oval buildings, divided into three ſtories, raiſed one above another: one of them is below the dike, and generally full of water; the other two are above it. They fix theſe little buildings in a very ſtrong and firm manner on the edge of the watering-place, and always by ſtories, in order to mount higher, in caſe the water ſhould riſe. If they find a little iſland near the watering-place, they build their houſes upon it, which is then more ſolid, and they are leſs incommoded by water, in which they cannot long remain. They make two doors at the bottom to go out into the water. One leads them to their bathing-place: the other is a paſſage to the place where they carry all the dirt, &c. from their upper apartments. They have a third door, higher up, for fear of being taken when the ice ſtops up the lower doors. They ſometimes build their houſes entirely on dry ground, and make ditches five or ſix feet deep, to get to the water. They uſe the ſame induſtry, and the ſame materials, for the buildings as for the

the dikes. The walls are perpendicular, and two feet thick. They cut off with their teeth the ends of wood which go beyond the level of the wall, then, mixing clay with dry herbs, they make a compoſition of it, with which they plaſter both inſide and ouſide of the work, by the help of their tail. The inſide of the houſe is arched; and the ſize is in proportion to the number of inhabitants. With their teeth they cut all the wood they require for building; they make uſe of their fore-feet to dig the ground, and to ſoften and mix the clay; their tail ſupplies the place of a wheel-barrow to carry their mortar or clay, and afterwards ſerves as a trowel to plaſter it on.

The works of the beaver have, then, the greateſt reſemblance with thoſe of man; of all animals we know, they come the neareſt to human reaſon. We need only obſerve them, to be convinced that beaſts are not mere machines, but that all their actions and motions are directed by a higher principle.

LESSON CI.

ANIMALS CONSIDERED AS EXAMPLES TO MANKIND OF VICES AND VIRTUES.

THE ſtudy of animated nature furniſhes us with many pleaſing ideas; eſpecially as it gives us every where proofs of the Divine Wiſdom and Goodneſs: but I do not know whether we attend as much as we ought to the leſſons of morality it ſeems intended to convey. It is remarkable that compaſſion belongs to man alone. In God is mercy, mercy free and infinite: in man compaſſion for all created beings. In the brute-creation ſome few inſtances of affection are found; no compaſſion properly ſo called; no free diſintereſted pity. Some virtues the brute creatures, eſpecially

cially the domeſtic animals, may teach us; and doubtleſs they were intended to do ſo. The innocent lamb, in a language more powerful than words, inſtructs us to practiſe the gentle meek arts of perſuaſion. The obedient ox and cow inculcate mild ſubmiſſion. The aſs is an example of patience; the generous horſe of activity, and aptneſs to receive inſtruction. The dog is an example of fidelity and kind attention; the cat of various domeſtic virtues. Friendſhip ſeems unknown, or but faintly expreſſed amongſt animals, excepting dogs and horſes; and in them it is chiefly towards man. The vices which the dumb animals teach us to avoid are much greater, and more in number, than their virtues. The gluttony and ſloth of the hog we deteſt. The pride and ill-nature of the peacock we diſlike as much as his voice. The turkey is a pattern of all the vices in man; and is an exception to [illegible] of the hog, to the [illegible] character of the domeſtic beaſts and birds.

Though what is here mentioned may be ſtyled common place, yet ſo long as mankind are inattentive, ſuch things may properly be pointed out, and much more might be ſaid. The beaver, if contraſted with that horrible creature called the glutton, the bee with the waſp, the ant with the fleſh-fly, would teach us, as well as the domeſtic animals, to do good, and avoid evil. But the ſubject is almoſt inexhauſtible. I will therefore conconclude with a part of the creation more numerous perhaps than all the reſt put together; I mean the fiſh, both thoſe with ſcales, and thoſe which have ſhells, they ſeem to travel in vaſt bodies, not from any love of ſociety, but merely becauſe they are born in the ſame or in neighbouring ſituations, and live on the ſame food, which they find near the coaſts where they themſelves are to feed us.

LESSON

LESSON CII.

SENSITIVE PLANTS.

WE obſerve certain motions in plants, which make it doubtful whether they have ſenſibility or not. There are vegetables, the flowers and leaves of which contract and ſhrink from the touch. We ſee others, which open and cloſe their flowers at certain fixed hours of the day, ſo regularly as to mark the time very exactly. Others take a ſingular form in the night, and fold themſelves up. Theſe motions in the plants are the ſame, whether they are in the open air, or ſhut up in a cloſe room. Thoſe which always live under water, raiſe their heads above it in the time of ſeeding. The movements of a marſhy plant diſcovered lately in Carolina are ſtill more ſingular: the upper ſide and edge of its round leaves are covered with a number of notches, which are extremely irritable; when an inſect chances to creep on this upper ſide, the leaf folds it up cloſe, and preſſes it to death, and then opens itſelf again. We may every day obſerve certain regular motions in ſome of the plants in our gardens. The tulips blow in fine weather, but they cloſe again when it rains, or at ſun-ſet. Scotch vegetables, ſuch as peaſe and beans, open their huſks when they grow dry, and roll up like chips. Wild oats, when put on a table, often move of themſelves, particularly if they have been made warm in the hand. Do we not alſo obſerve the ſun-flower, and ſeveral other plants, always turned towards the ſun? Theſe are undeniable facts, which any body may eaſily experience. From thence it was wiſhed to draw a concluſion, that there was ſome ſenſibility in plants; and it is true, that the above-mentioned facts give

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ſome degree of probability to that opinion. But, on the other hand, there has not been any other mark of ſenſibility diſcovered in plants; every thing appears abſolutely mechanical in them. We plant a ſhrub, and deſtroy it, without obſerving any analogy between the animal and it. We obſerve a plant ſhoot, grow, bloſſom, and turn to ſeed, as we obſerve the hand of a watch run over all the points of the dial. The moſt exact anatomy of a plant does not diſcover any organ the leaſt reſembling the ſeat of animal ſenſibility. When we oppoſe theſe obſervations to thoſe from whence the ſenſibility of plants may be inferred, we remain in doubt, and know not how to explain the above-mentioned phenomena. Perhaps, all we obſerve in regard to the motions of plants may only proceed from the conſtruction of ſome of their fibres, which ſometimes contract, and ſometimes expand. Perhaps the ſubtile exhalations of our bodies cauſe the ſenſitive plants to ſhrink when we touch them. But it may alſo poſſibly be, that all nature being linked, the firſt degree of ſenſation may ſubſiſt in certain plants; as indeed the ſtep is very narrow between the plant and the muſcle ſhell-fiſh. Therefore, ſenſibility may perhaps extend even to plants, at leaſt to thoſe neareſt to the animal.

Behold, how very imperfect our knowledge is on theſe ſubjects! All is mere conjecture: yet we know enough to ſatisfy a reaſonable curioſity. Let us endeavour to apply the knowledge we have, without loſing time in ſpeculations more curious than uſeful; and without aiming at underſtanding what may perhaps be reſerved for thoſe who come after us, or even to eternity itſelf.

LESSON

LESSON CIII. THIRTY-FIFTH WEEK.

VARIETY OF PLANTS.

ONE of the things moſt worthy our admiration in the vegetable kingdom, is the great variety of plants. They are varied in reſpect to their parts, their production, their properties, and qualities. The manner in which ſome plants become fruitful is ſtill very obſcure. It is little known, for example, how it operates in moſs, muſhrooms, and fern. There are plants which ſhew us ſingular monſtroſities: there are flowers which have no heads; there are ſome, from the middle of which ſpring out other flowers. Certain plants, called ſoporiferous, which turn at night differently from what they do in the day. Others turn towards the ſun; others ſhrink and contract when we touch them. There are flowers which open and ſhut at certain regular hours. Some ſhoot up, bloſſom, bear fruit, and drop their leaves, ſooner than others. All plants are originally wild; that is, they grow without culture. The Creator aſſigned for plants a climate adapted to their nature and purpoſes, and where they ſhould arrive at the greateſt perfection. But thoſe which are exotic may be naturalized with us, and made to ſucceed very well, provided care is taken to procure for them the degree of heat their nature requires. What particularly charms the eye is the variety of forms and colours in plants. Let even the different ſorts of the ſame ſpecies be compared, and we cannot but admire the aſtoniſhing variety of models in the vegetable world. We ſtep with wonder from the truffle to the ſenſitive plant, from the muſhroom to the carnation, from the acorn to the lilac, from the *noſtoch* to the roſe-tree, from moſs

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to the cherry-tree, from the morel to the oak, from the miſletoe to the orange-tree, from the ivy to the fir. If we conſider the numerous ſorts of muſhrooms, or the kind of plants which we call imperfect, we cannot but admire the fertility of nature in the production of thoſe vegetables, which are ſo different in form from the others, that we can ſcarce rank them among plants. If we afterwards riſe ſome ſteps up the chain of plants, we behold with pleaſure the degrees of thoſe with ſtalks, from the graſs which grows between the ſtones, to that ineſtimable plant to which we owe our principal food. We, in the next place, obſerve the variety of creeping plants, from the tender bind-weed to the vine. We cannot too much admire the perfect harmony, as well as the variety of the works of nature. Every plant, from the hyſſop, which grows on walls, to the cedar of Lebanon, have the ſame eſſential parts. A little herb is as complete a plant as the moſt beautiful roſe, and the roſe is not leſs ſo than the fineſt oak. Though each ſpecies is diſtinct from the other, all belong to the ſame ſource; all obſerve the ſame general laws of growth. Let us acknowledge the greatneſs of that power, who produced and ſupports ſo great a variety in the vegetable kingdom.

LESSON CIV.

DIVISION OF THE EARTH.

ALL the known countries of the earth are divided into four principal parts, Europe, Aſia, Africa, and America.—Europe is the ſmalleſt. The Europeans, however, poſſeſs ſome countries in the three other parts of the world, and have ſubdued near one half of the earth. They travel into the

four

four quarters of the globe, and trade with all the different countries; nor do we know of people ſo well informed, or who cultivate the arts and ſciences with more ſucceſs. Europe is the only part of the earth which is every where cultivated, and covered with towns and villages; the only place where the inhabitants keep up a conſtant intercourſe, and profeſs nearly the ſame religion. The three other parts are inhabited by a multitude of different nations, which have no connexion with one another; who are ſcarce acquainted; and who differ greatly in ther manners, way of living, and in their religion.—Aſia is the largeſt known continent: as the countries that are in the interior of this part of the world do not enjoy the cool ſea breezes, as they are not watered by many rivers, as they have vaſt plains and barren mountains, the heat and cold are in the extreme. Some parts of Aſia are only inhabited by people, who in the morning pull down their towns and villages to carry them ſome miles further, and build them up again at night in an hour. It ſeems as if nature had made this wandering and unſettled life neceſſary; and intended, that the eſtabliſhment, laws, and government of theſe people ſhould be leſs durable, and more ſubject to change, than elſewhere. The other people of Aſia often ſuffer greatly from the reſtleſs and unquiet character of theſe wandering nations. The northern parts, which are full of lakes, marſhes, and foreſts, have never been regularly inhabited; but the ſouthern, eaſtern, and weſtern countries are the fineſt in the world, and are wonderfully fertile, producing the neceſſaries of life in great abundance. Next to Aſia, Africa is the largeſt part of our hemiſphere, ſince it is a thouſand leagues ſquare. As it is under the torrid zone, there are immenſe ſandy deſerts, mountains of prodigious height, foreſts inhabiting monſters of various ſorts. The oppreſſive

preſſive heat enervates and weakens every faculty of Europeans, to whom the innermoſt parts of Africa are ſtill unknown. America was not diſcovered by the Europeans till within ſome centuries. It is divided into two continents, ſeparated only by a very narrow iſthmus, or neck of land, and ſurrounded by a great many iſlands. The cold climate of the northern part, its few productions, and its diſtance from inhabited countries, prevent its being entirely known as yet; but we have every reaſon to believe, that the natives are uncivilized. The earth there is ſtill covered with foreſts and marſhes; and hitherto the Europeans have only cultivated the eaſtern coaſts. In the ſouth of America there were formerly ſome great nations. The remainder was inhabited by ſavages. It is the country for ſerpents, reptiles, and inſects, which are much larger there than in Europe. It may be ſaid, on the whole, that America is the country of greateſt extent, but with the feweſt inhabitants.

If we reckon the number of leagues theſe four parts of the globe occupy, their ſize will appear very conſiderable; and yet all the known countries make but a fourth part of this earth. And as we know but little of the worlds above us, let us at leaſt endeavour to know that which we inhabit, and to turn that knowledge to the glory of the Almighty.

LESSON CV.

MORAL REFLECTIONS ON SEEING A FIELD OF CORN.

THIS field was lately expoſed to great danger, impetuous winds whiſtled round it, and the ſtorms often threatened to beat down and deſtroy the

the wheat. However, Providence has preſerved it hitherto. It is thus that the ſtorms of affliction often threaten to overwhelm us. But this very tempeſt is neceſſary: it purifies and roots out the tares of vice. In the midſt of trouble and ſorrow, our knowledge, faith, and humility, increaſe and ſtrengthen. It is true, that, like the weak ear of corn, we ſometimes bend and are bowed down to the ground; but the merciful hand of our Father ſupports and raiſes us up again. Towards harveſt time, the corn ripens faſt. The dew, the heat of the ſun, and the rain, all combine to haſten it. Oh! may we, from day to day, grow ripe for heaven. May all the events of our lives lead to that ſalutary end. Whatever be our ſituation here; whether the ſun ſhines upon us, or is wrapt up in clouds; whether our days be gloomy or ſerene; no matter, provided all concur to increaſe our piety, and diſpoſe us better for eternity. It is very remarkable, that the ears of corn loaded with grain differ conſiderably in height from thoſe that are poor and thin. The latter are upright, riſe high, and overlook the whole field; whereas the others bend under their own weight. Behold the emblem of two ſorts of men! The vain and preſumptuous, who do but little, ſet themſelves above others, and look with contempt on the truly humble. A fooliſh preſumption blinds them, and makes them deſpiſe the means of ſalvation. Thoſe, on the contrary, who are rich in virtue and good works, humbly bend down like the well-filled ears of corn. How many tares and weeds are mixed with the corn! Such is the ſituation of a Chriſtian in this world. There is always a mixture in him of good and bad qualities, and his corrupted nature, like the tares, often interrupts the progreſs of virtue. A field of corn is not only the image of one individual, but alſo of the church in general. The profane and the

the wicked often, by their bad example, ſow tares in a field where there ought to be none but good ſeed. The great Lord of the field permits the tares to remain ſome time. He tries patience and forbearance; and it will not be till the time of harveſt, in the great day of retribution, that he will give free courſe to his juſtice. Behold with what eagerneſs the country people run to gather the fruits of the earth! The ſcythe cuts all before them. Thus death ſweeps all away, the high and the low, the ſaint and the ſinner. Then let us hope we ſhall meet in the bleſſed ſociety of angels! That we ſhall gratefully recollect our paſt labour and pain, the dangers and ſtorms we had experienced, and that we may be able to raiſe our voices with one accord to bleſs the beneficent Father who watched over us. May this ſweet hope ſupport us in the time of trouble. Let it comfort us in our ſorrow, and make us wait with patience for the day of harveſt.

LESSON CVI. THIRTY-SIXTH WEEK.

THE BEAUTY AND VARIETY OF THE BUTTERFLIES.

LET us reflect on theſe little creatures before they are gone. Perhaps our obſervations will intereſt both the heart and the mind. Of ſome the dreſs is plain and ſimple; others have a few ornaments on their wings; but ſome have a profuſion, and are all over covered with them. How beautiful the ſhades variegate! With what delicacy has natured penciled them! But, however great our admiration in ſeeing this inſect with the naked eye, how much it increaſes when examined through a microſcope? Would any one ever have imagined,

that the wings of butterflies were covered with feathers; and yet nothing is more certain. What is commonly called duſt, is found in reality to be feathers. There is as much ſymmetry in their conſtruction and form, as there is beauty in their colours. The parts which make the centre of theſe little feathers, and are next to the wing, are the ſtrongeſt. Thoſe, on the contrary, which form the exterior circumference, are much more delicate, and moſt wonderfully fine. All theſe feathers have quills at bottom; but the upper part of them is more tranſparent than the quills. If the wing is touched roughly, the moſt delicate part of the feathers is deſtroyed by it; but if all that we call duſt ſhould be rubbed off, there would only remain a fine tranſparent ſkin, in which we might diſtinguiſh the little cells, or hollows, wherein were ſtuck the quill of each feather. This ſkin, from the manner in which it is compoſed, may be diſtinguiſhed from the reſt of the wing, nearly as we diſtinguiſh a fine lace from the linen on which it is ſewed; it is more porous, more delicate, and ſeems as if embroidered with a needle. Laſtly, it is edged with a fringe, regular, and exquiſitely fine. What are our moſt elegant dreſſes, in compariſon with that which nature has given to this inſect? How very delicate does a fine cambric appear to us! How fine the threads, how regular the weaving; and yet, through the microſcope, they appear like pack-thread; and we ſhould rather ſuppoſe they were interwoven by a baſket-maker, than produced from the loom of a good weaver: yet this beautiful inſect proceeds from a mean looking worm. How much it has changed, ſince in the form of a reptile, it crawled in the duſt, in danger of being cruſhed! In this extraordinary inſect, we may ſee the emblem of the tranſformation which awaits us. A day will come,

when,

when, quitting our preſent form, we ſhall ceaſe to crawl upon the earth. Being made perfect, and having nothing to ſet bounds to our flight, we may then ſoar beyond the ſtars themſelves.

LESSON CVII.

THE FORMICA LEO, OR LION ANT

NO inſect is more famous for its dexterity than the *formica leo*, although its form promiſes nothing extraordinary. It is ſomething like the wood-louſe. It has ſix feet, and its body (which is compoſed of ſeveral membraneous rings) terminates in a point. Its flat ſquare head is armed with two moving hooped horns, the ſingular conſtruction of which ſhews how admirable nature is, even in its ſmalleſt works. This inſect is the moſt cunning and dangerous enemy the ant has. The plans he forms to catch his prey are moſt ingenious. He undermines a piece of ground, in the ſhape of a funnel, in order to ſtay at the bottom of it, and draw down any ants which may chance to come to the brink of this precipice. The method of digging it is, firſt to trace a circular ridge in the ſand, exactly the ſize of the funnel, the diameter of which is always equal to the depth he chooſes to make it. When he has fixed on the ſize of this opening, and traced the firſt ridge, he immediately digs a ſecond, concentric to the other, in order to throw out all the ſand encloſed in the firſt circle. He performs all this with his head, which is like a ſhovel: the flat and ſquare ſhape makes it fit for the purpoſe. He alſo takes up ſand with one of his fore-feet, and throws it over the firſt ridge; and this he repeats till he has got to a certain depth in the ſand. Sometimes in digging he

meets grains of ſand rather large, or little bits of dry earth which he cannot bear in his funnel, and gets rid of it by a quick well meaſured motion of his head. If he finds ſtill larger pieces, he endeadeavours to put them away with his back; and he is ſo earneſt in this labour, that he repeats it ſix or ſeven times. His traps once laid, he is on his watch. Quite ſtill and concealed at the bottom of the hole which he has dug, he there waits for the prey which he could not purſue. If an ant comes to the brink of the precipice, it ſeldom fails of falling to the bottom, becauſe the edge goes ſloping, and the loſe ſand which gives way under his feet, draws down the inſect into the power of his enemy, who drags him with his horns under the ſand, and feaſts upon him. When there remains nothing but the dry carcaſe, he throws it out of the hole; and if the bank is hurt at the top, he put it in order again, and lies in ambuſh as before. He does not always ſucceed in catching his prey the moment it falls. It often eſcapes, and endeavours to run up again to the top; but then the formica leo works with his head, and throws up a ſhower of ſand higher than the ant, which drives it down again into the hole. All the actions of this little animal contain ſuch wonderful art, that we can ſcarce tire of examining him. He prepares the hole even before he ſees the inſect deſtined to become his food, and yet his actions are ſo regulated, that they prove the ſureſt means of providing for his ſubſiſtence. How could ſuch an inactive creature as this catch his prey ſo well as, by digging in looſe ſand, and giving a ſloping form to the hole he makes, and then covering with a ſhower of ſand the inſect which falls into it? All its actions have fixed principles, by which he is directed. His ditch ought to be dug in the ſand, or it would not be adapted for attracting his prey. According to the

the make of his body, he is obliged to work backwards, and to make uſe of his horns as tongs to throw up the ſand to the edge of the funnel.

The inſtinct which directs this inſect, diſcovers to us a Firſt Cauſe, whoſe foreſight knew and ordained all that was neceſſary for the preſervation and welfare of this animal. The dexterity it ſhews is not the effect of experience or practice: it is born with it. We muſt therefore ſeek its ſource in that Great Being who proportions the inſtinct of animals to the degrees they require.

LESSON CVIII.

THE NATURE AND PROPERTIES OF SOUND.

ALL ſounds are produced by means of the air; but it is neceſſary for that purpoſe that the air ſhould be in motion. It is not that every movement of the air occaſions a ſound; for if this was the caſe, all wind muſt be attended by a noiſe. In order to form a ſound, the air muſt be ſuddenly compreſſed; and muſt dilate and extend again by its elaſtic power. This occaſions a kind of trembling undulation, ſomething like that of the waves and circles occaſioned by throwing a ſtone into the water. But if this undulating motion was only to be effected by the particles of air being compreſſed, the ſound would never reach our ears. It is neceſſary that the ſonorous bodies, after making impreſſion on the contiguous air, ſhould continue that impreſſion from particle to particle all about us. By this means the particles of air reach our ear, and we have a perception of ſound. This progreſs is made with prodigious ſwiftneſs. Sound goes a thouſand feet in a ſecond of time,

and confequently a German league in twenty feconds. It is very remarkable that a weak found propagates as quick as a loud one. The motion of the air, however, is ftronger when the found is ftronger, becaufe a greater mafs of air is put in motion. A thin elaftic membrane, ftretched at the bottom of the ear like a drum, receives the vibrations of the air; and by that means we have the power of diftinguifhing founds. If there were no founds, all mankind would be dumb, and we fhould be as ignorant as a child before it can fpeak; but by means of founds, every creature can exprefs its wants and its enjoyments. But if we inquire, how it is that, when we pronounce a word, it creates in us the idea of a word, and not a mere found, or how a tone can act upon our fouls, and produce fo many different fenfations, we are obliged to acknowledge our ignorance of all this. It is enough for us to be convinced by this, as by every thing elfe, of the wifdom and goodnefs of our Creator.

LESSON CIX. THIRTY-SEVENTH WEEK.

THE MYSTERIES OF NATURE.

WHEN men attempt to penetrate into the caufes of the effects daily under their obfervation, they are obliged to acknowledge how limited their underftandings are. There are a great number of effects in nature concealed from us; and thofe which we are able to explain have ftill fome obfcurity in them, which reminds us that we are but men. We hear the wind whiftle; we experience its great and its different effects; but we know not exactly what produces it, what increafes its violence, or what abates it. From a little grain, we behold

behold grafs fpring up, ftalks and ears of corn; but we are ignorant how it is done. We ftill lefs comprehend, how from a little fruit-ftone there can grow a plant, and then a great tree, under whofe fhade the birds make their nefts; which tree is covered with leaves and bloffoms, to fhade us, and afford us fruit to eat, and wood for our ufe and convenience. We behold the wonderful effects of the loadftone, and we believe there muft be a certain matter which operates in it; but whether it acts by an attractive force peculiar to itfelf, or whether it circulates continually round the loadftone, and forms a fort of vortex, is what we cannot decide. We feel the cold, but no man has yet difcovered what occafions it. Nature at every ftep prefents us wonders which confound us; and whatever refearches, whatever difcoveries, we have made, there ftill remains many things we cannot comprehend. It is true, we fometimes are able to give happy explanations of certain phenomena; but the principles, the firft fprings, their nature and manner of operating, are certainly above the fphere of our underftanding.

The myfteries of nature afford us daily leffons of wifdom, in regard to the myfteries of religion. In nature, God has placed within our reach the means of paffing our temporal lives happily, although he has concealed the caufes from our fight. Thus, in the kingdom of grace, he furnifhes us with means of arriving at a fpiritual and everlafting life, though the manner in which they operate remains concealed from us. Would any one refufe to eat and drink, till he knew how it is that food gives him ftrength, and preferves his life? Or would he neither fow nor plant for want of having a juft idea of the manner in which vegetation operates? If we find things which we cannot comprehend, or thoroughly know, let us

receive them with humility, and acknowledge the weakneſs of our underſtanding. The advantage they are to us, when we make a good uſe of them, convinces us they are the work of a Being infinitely wiſe and beneficent; and this is ſufficient for us to know.

LESSON CX.

FISH.

WHO that had never ſeen fiſh would have believed there were ſuch creatures? If a naturaliſt only knew animals that walk and breathe on land, as the rein-deer does, and was told that there were creatures in the water, ſo formed as to live, move, multiply, and to fulfil every animal function in that element with eaſe and pleaſure, would he not treat it as a fiction; and conclude, from the effect on our bodies, when plunged in water, that it is abſolutely impoſſible to live in that ſituation. It is certain, that the way in which fiſh live, their conſtruction, motion, &c. are quite wonderful, and afford freſh proofs of the omnipotence and infinite wiſdom of our Sovereign Creator. To enable theſe creatures to live in water, it was neceſſary to form their bodies in eſſential points, very different from thoſe of land-animals; and we accordingly find this the caſe, in fiſh, both within and without. Why has the Creator given to moſt fiſh a ſlender thin body, flattened at the ſides, and always a little pointed at the head, if it is not that they ſhould ſwim, and cut their way better in the water? Why are they covered with ſcales of a horny ſubſtance, if it is not to preſerve their bodies from being hurt by the preſſure of the water? Why are ſeveral ſorts of fiſh (particularly thoſe without ſcales)

ſcales) enveloped with a fat and oily ſubſtance, if it is not to preſerve them from putrefaction, and to guard them from cold? Why are the fiſh-bones ſo different from other bones, if it is not to make their bodies more flexible? Why are the eyes of fiſh ſunk into the head, if it is not to guard them better from being hurt? It is evident, that in the formation of all thoſe parts, the Creator has conſidered the way of life and deſtination of theſe animals. But there are ſtill more wonderful circumſtances in their conſtruction. The fins are almoſt their only limbs, and yet are ſufficient to perform all their motions. By means of the tail-fins, they move forward; the back-fin directs the motion of the body; they raiſe themſelves up by the breaſt-fin, and that of the ſtomach ſerves to balance them. The gills are their organs of reſpiration. Theſe are behind their head. There are four on each ſide, the uppermoſt of which are the largeſt. They are continually ſwallowing water through their mouths, which is their drawing in of breath, and they caſt it through their gills, which is their way of breathing out again. The blood which comes from the heart, and flows into the veins of the gills, does not return back to the heart through the lungs, as in land-animals, but it is directly diſperſed throughout all parts of the body. One of the organs moſt neceſſary to fiſh in ſwimming, is the bladder of air in their ſtomach. By means of this bladder they make their body more or leſs heavy. When this vein ſwells and extends, they become lighter, can raiſe themſelves, and ſwim to the ſurface of the water. When it contracts, and the air is thereby compreſſed, the body becomes heavier than the water, and conſequently ſinks down. The prodigious quantity of fiſh, with the great variety of ſhape and ſize, is worthy admiration. In Germany alone there are above four hundred ſpecies

of fiſh; and who can count the numbers there are of each ſpecies? The very largeſt, as well as the ſmalleſt of animals, are to be found amongſt fiſh. Which then ought we moſt to admire in all this, the power and wiſdom of the Creator in the forming and preſerving of theſe animals, or his goodneſs in giving them for our uſe.

LESSON CXI.

INFLUENCE OF THE MOON ON THE HUMAN BODY.

FORMERLY there were imputed to the moon certain influences upon the body, which were only calculated to raiſe ſuperſtition and groundleſs fears. The gardener would not plant till he had conſulted the moon. The ploughman deferred ſowing till he was certain of its happy influence. Sick people attended, with ſuperſtitious exactneſs, to the changes of the moon; and the phyſicians themſelves obſerved it in their preſcriptions. By degrees theſe prejudices have been removed. This is one of the advantages the preſent age has over the former. It is our duty to make it ſtill more univerſal, and to endeavour to baniſh as much as we can the old ſuperſtitions. In regard to the influence of the moon on our bodies, the ſafeſt way is to preſerve a medium: for as it would be irrational to attribute to that planet too great a power over the human body, ſo it would be no leſs raſh to deny it any effect. It muſt in reality be allowed, that the moon occaſions great changes in the air, and of courſe may produce ſome in our bodies. The moon cauſes ſuch conſiderable alteration and motion in the higher atmoſphere, that earthquakes, winds, heat, cold, vapours, and fogs, reſult

refult from thence; and in that cafe, the health of our body will, in a great meafure, depend on the influence of the moon. The power this planet has over the human body is founded on an undeniable principle, which is, that our health greatly depends on the weather, and the fort of air we breathe; and it is certain that the moon caufes many alterations in the atmofphere. Perhaps there may be even a flux and a reflux in the human body occafioned by the moon, like that in the air and fea.

In general, it is a principle we ought to admit, to the glory of our Creator, that throughout all natural things there are certain connexions, which influence in different ways the animal economy. There are without doubt many wonders in the atmofphere, ftill remaining unknown to us, which caufe many confiderable revolutions in nature. Who knows if fome of the phenomena of the natural world, which we do not think of, or which we attribute to other caufes, may not depend on the moon? Perhaps the light it affords us in the night is one of the leaft of the purpofes for which the Almighty formed this planet. Perhaps its being fo near our earth was to produce certain effects on us, which the other celeftial bodies, from their diftance, could not do. It is at leaft certain, that every thing in the univerfe has relation more or lefs remote from our globe. And this is what renders the world a mafter-piece of the Divine Wifdom.

LESSON CXII. THIRTY-EIGHTH WEEK.

THE IGNIS FATUUS.

THE Ignis Fatuus are little light flames, which play in the air, only a few feet from the ground, and appear to go here and there, and

every where. Theſe fires ſeem ſometimes to diſ-appear and go out all at once, probably when buſhes or trees conceal their light, but they kindle again immediately in other places. They are not common in cold countries; and it is ſaid that in winter they chiefly appear in marſhy places. In Spain, Italy, and other hot countries, they are known at all ſeaſons; and neither rain nor wind extinguiſhes them. They are frequently ſeen where there are putrid plants, or animal matter, as in church-yards, ſhores, rich and marſhy ground. There have been too few experiments made on theſe ſorts of ethereal fires, to determine preciſely as to the nature of them. But the places where they are generally ſeen may give riſe to probable conjectures; for as they ſcarcely ever appear but in marſhy countries, it is natural to ſuppoſe them ſulphureous vapours which take fire. It is known, that carcaſſes and rotten plants ſometimes caſt out light. Perhaps vapours condenſed by the cold of the night take the appearance of the Ignis Fatuus. Perhaps it may be the effect of a ſlight electricity produced by the interior motion of the vapours which riſe in the air. Horſes, dogs, cats, and even men, may become ſo electrical as to caſt out ſparks of fire, when they are rubbed, or otherwiſe put in motion. May not this be the caſe with ſome parts of the earth? It may ſo happen, that, in ſome circumſtances, a field ſhall be electrified in ſome parts of it, and then it is not ſurpriſing that it ſhould appear luminous.—Even the air may occaſion the Ignis Fatuus, when it is electrified to a certain degree. If the manner of their being produced is ſtill doubtful, we are certain, at leaſt, that they proceed from natural cauſes, and conſequently are not obliged to have recourſe to ſuperſtition. What may have given riſe to this ſuperſtitious idea, is the obſerving that the Ignis Fatuus

follows

follows all the ways of the wind, and thus flies from thoſe who purſue it; and, on the contrary, follows thoſe who try to avoid it, and fixes on carriages which go ſwiftly. But the reaſon of this phenomenon is very evident: for the perſon who purſues this flame drives the air, and conſequently the fire before him: whereas the perſon who flies leaves an empty ſpace, which the ambient air fills up continually. This produces a current of air between him and the fire, and of courſe draws it after him. This is the reaſon we obſerve it ſtop when the perſon ceaſes to run. How much we torment ourſelves by vain terrors, which have no foundation but a diſordered fancy. We might ſpare ourſelves many fears, if we would take the trouble to examine the objects which frighten us, and ſeek for their natural cauſes.

LESSON CXIII.

OF MINERALS.

IN order to provide mankind wholeſome and convenient dwellings, they require many materials. If theſe materials had been ſpread over the ſurface of the earth, it would have been entirely covered with them, and there would not have been room for the animals and plants. Our earth is happily free from ſuch incumbrance. The ground is left free to be cultivated and enjoyed by its inhabitants.

Minerals may properly be divided into four claſſes of very diſtinct characters. The firſt includes *foſſils*. We give that name to minerals, which cannot be diſſolved either in water or oil, and are not malleable, and which bear the fire without loſing any ſubſtance in it. To this claſs belong not

not only the ſimple earths, but the ſtones alſo which are compoſed of them. There are two ſorts of ſtones, the precious and the common ſtones. The latter are very numerous, and preſent us maſſes different in form, ſize, colour, and hardneſs, according to the earth, ſulphur, &c. of which they are compoſed. Precious ſtones alſo differ very much Some are perfectly tranſparent, and appear to be moſt ſimple. Others are more or leſs opaque, according as they are compoſed more or leſs of heterogeneous particles. The *ſalts* form the ſecond claſs of minerals. It comprehends bodies which water diſſolves, and which produce a reliſh. They are divided into acids, which are ſharp and ſour, and into alkalies, which leave an acrid, burnt lixivious taſte on the tongue. Theſe have the property of changing into green the blue juice or dies of vegetables. From the juſt and exact mixture of theſe two different ſalts, tempered by each other, proceeds the neutral or middling ſalts; ſuch as the common kitchen ſalt, which is either taken out of the earth, or prepared with ſea-water, or obtained by the evaporation of ſalt water boiled in great caldrons. All theſe ſalts together are one of the chief cauſes of the vegetation of plants. They poſſibly ſerve alſo to unite and fix them, as well as all the other compound bodies. Laſtly, they occaſion fermentation, the effects of which are ſo numerous and ſo different. The third claſs of minerals comprehend inflammable bodies, to which are given the name of *bitumens*. They melt in the fire; and when they are pure, they diſſolve in oil, but never in water. They are diſtinguiſhed from other minerals by the inflammable ſubſtance they contain more of than any other, and which renders combuſtible the bodies they mix with, if in ſufficient quantity. The fourth claſs of minerals is the *metals*. They are much heavier than the reſt.

reſt. They become fluid in the fire, but they reſume their ſolid ſtate when cold. They are bright, and are capable of being diſtended under the hammer. There are ſome metals, which, though melted in the fire, do not diminiſh in weight, or undergo any other ſenſible alteration. This gives them the name of *perfect metals*. There are two of this order, viz. gold and ſilver. The metals called *imperfect* are reduced more or leſs quickly by fire, and generally change into a calx. One of theſe (lead) has the property of changing into glaſs, and of vitrifying alſo all the other metals, except gold and ſilver. There are five of the imperfect metals, quickſilver, lead, copper, iron, and tin. Laſtly, there are bodies which differ from theſe metals by not being malleable. They are called half-metal, and there are ſeven of them; the platen, biſmuth, nickel, arſenic, antimony, zink, and cobalt.

The mineral kingdom is the great warehouſe of nature, where ſhe ſecretly labours for the good of the world. No naturaliſt can ſurpriſe her in her operations, and ſteal from her the art with which ſhe prepares, collects, and compoſes earths or foſſils, ſalts, bitumens, and metals. Happily, in the uſe we make of nature's gifts, it is of little conſequence that we ſhould know their origin and firſt principles. It is enough that we ſhould underſtand their uſe. We want no more to prove the glory of the Creator, as we are convinced that there is not a ſpot, either above or below the earth, in which he has not ſhown his power, wiſdom, and goodneſs.

LESSON

LESSON CXIV.

SOME OF THE CHIEF EXOTIC PLANTS.

WE do not pay attention enough to the gifts of God, particularly to thoſe which come to us from diſtant countries, and are now ſo neceſſary to us. If we conſidered how much trouble it coſts, and how many wheels in the machine of the world muſt be put in motion, and how much human induſtry it requires to procure us a ſingle bit of ſugar or cinnamon, we ſhould not receive the preſents of nature ſo coldly as we generally do; but on the contrary, we ſhould look up wth the warmeſt gratitude towards that beneficent Being, who makes uſe of ſo many means of beſtowing bleſſings upon us. Sugar, properly ſpeaking, is the ſalt found in the juice or marrow of a certain reed, which is cultivated chiefly in Braſil and the neighbouring iſlands; but which alſo grows in great abundance in the Eaſt-Indies, and ſome of the African iſlands. The preparation of ſugar does not require much art, but is extremly laborious; and it is generally the employment of ſlaves. When the canes are ripe, they cut and carry them to the mill, to bruiſe and extract the juice from them. They firſt boil this juice, which would otherwiſe ferment and grow ſour; while it is boiling, they ſkim it to take off any dirt. They repeat this courſe four times in different caldrons. To purify it and clarify it the more, they throw into it a ſtrong lye of wood aſhes and burning lime, and at laſt pour it into the moulds where it coagulates and dries. Tea is but the leaf of a ſhrub, which grows in Japan, China, and other Aſiatic provinces. Three or four times during ſpring, theſe leaves are gathered. Thoſe of the firſt crop are the

the fineſt flavoured, and the moſt delicate. This is the imperial tea; but it never comes into Europe. That which the Dutch ſell under that name is tea of the ſecond crop. Coffee is the ſtone of a fruit like a cherry. The tree which produces it is originally from Arabia; but it has been tranſplanted into ſeveral hot countries. Next to Arabia, it is beſt cultivated in the iſle of Martinico. We call the ſtone in the middle of the fruit the berry. This berry, when freſh, is yellowiſh, or grey, or a pale green; and it preſerves this colour in ſome degree when dry. They ſpread the fruit on mats to dry in the ſun; and afterwards bruiſe it with rollers to force out the berries. This is what divides the berry in two. They again dry them in the ſun before they put them on ſhip-board. The cloves are buds, or dried bloſſoms of a tree, which formerly grew without culture in the Molucca iſlands, but which the Dutch have tranſplanted to Amboyna. This tree is of the ſize and ſhape of the bay-tree: its trunk is covered with bark, like that of the olive. White bloſſoms grow in tufts on the extremity of the branches, and look like a clove. The buds are at firſt of a pale green, afterwards they become yellow, then red, and at laſt a dark brown, ſuch as we ſee them. They have a ſtronger and more aromatic ſmell than the mother clove, a name which marks the dry fruit of the tree. Cinnamon is the ſecond bark of a kind of a bay-tree, which ſcarce grows any were at preſent but in the iſland of Ceylon. The root of the cinnamon tree divides into ſeveral branches. It is covered with a bark, grey without, and red within. The leaf would a good deal reſemble the laurel, if it was ſhorter and leſs pointed. The bloſſoms are ſmall and white, of a very pleaſing ſmell, very much like the lily of the valley. When the tree is ſome years old, the two barks are taken off; the outer bark

bark is good for nothing, and thrown away; the inner one is dried in the ſun, where it rolls up of itſelf, about the ſize of a finger; and this is what we call cinnamon. The nutmeg and mace come from the ſame tree, and grow in the Molucca iſlands. The nut is covered with three coats. The firſt falls off of itſelf when it is ripe; the ſecond then appears, which is very thin and delicate. It is taken off with great care from the nut, and expoſed to the ſun to dry. This is called mace in the Molucca iſles; though in other places improperly called nutmeg-bloſſom. The third coat is immediately next the nutmeg. They take the nut out of its ſhell, and put it into lime-water for ſome days, and then it is properly prepared to ſend abroad. Cotton grows in moſt of the countries of Aſia, Africa, and America. It is encloſed in the fruit of a certain ſhrub. This fruit is a ſort of pod, which when ripe opens a little and ſhews a wad or flock of down, extremely white, which we call cotton. When this pod is ſwelled by the heat, it becomes as large as an apple. With a little mill they ſeparate the ſeed from the cotton. The ſeed falls out on one ſide, and the cotton on the other. They afterwards ſpin it for all ſorts of work. Olive-oil is the juice ſqueezed out of that fruit, which grows ſo abundantly in France, Spain, Portugal, and Italy, that there are whole foreſts of olive-trees. The inhabitants of the provinces where there are many of theſe trees, make uſe of this oil inſtead of butter; becauſe they have not much cattle, as the extreme heat dries up the graſs. Pepper is the fruit of a ſhrub, the ſtalk of which requires a prop to ſupport it. Its wood is knotty like the vine, which it much reſembles. Its leaves, which have a very ſtrong ſmell, are of an oval form, and terminate in a point. In the middle, and at the ends of the branches, there are white

bloſſoms,

bloſſoms, from whence ſpring fruit in cluſters, like the gooſeberry. Each cluſter bears twenty or thirty ſeeds.

Behold how every country contributes to furniſh us with the neceſſaries and conveniences of life. And how can we forget God, who every where provides for us, and ſignalizes his goodneſs towards us over the whole earth?

LESSON CXV. THIRTY-NINTH WEEK.

THE VINE.

WE need only reflect on the vine, to be convinced how unreaſonable thoſe are who complain of the inequalities and unevenneſs of the ground. The vine never flouriſhes on a flat, neither does every ſort of hill agree with it, but thoſe only which are turned towards the eaſt or ſouth. Hills are in a manner the bulwarks of nature, which ſhe invites us to cultivate as ſo many vaſt walls for fruit, where the warm reflection of the ſun unites with the fine open air to nouriſh them. Even the moſt barren hills, and thoſe hanging grounds, where the plough cannot be uſed, are every year covered with the moſt beautiful verdure, and produce the moſt delicious of all fruit. If the ſoil where the vine grows appears ſo poor and bad, the plant which furniſhes us with wine is little better. Who would have thought that it could produce ſo valuable a liquor? And yet ſuch is the fire with which the vine is animated, that the ſap flows through it with five, or even eight times more force, than the blood in the veins of animals.

Aſia is originally the country of the vine. From thence its cultivation has gradually extended into Europe.

Europe. The Phenecians, who travelled in early days over all the Mediterranean coasts, conveyed it to several islands, and to the continent. It succeeded wonderfully in the islands of the Archipelago, and was afterwards carried into Italy. The vines multiplied greatly there; and the Gauls having tasted the juice, and wishing to settle in the places where the vines grew, passed the Alps, and went to conquer both the borders of the Po. By degrees vines were cultivated all over France, and at last on the borders of the Rhine, the Moselle, Necker, and other provinces of Germany.

These observations may give rise to many important reflections. As the most barren soil is fit for the culture of vines, so it often happens that the poorest countries are favourable to science and wisdom. We have known, in provinces universally despised for their poverty, geniuses rise up, who have by their knowledge enlightened other kingdoms

The vine, with its dry and shapeless wood, is an emblem of those, who, devoid of the outward splendour of birth and honours, fail not to be very useful. How often does it happen, that men who live in obscurity, and whose appearance promises nothing, are, however, capable of actions, and perform enterprises, which raise them above all the esteemed great people on earth.

Let us here reflect on Christ himself. To judge of him by the low condition in which he appeared, who could have expected from him such great works, so wonderful, so salutary to mankind? He has, however, performed them. This Christ, who, like the vine, was planted in a barren soil, has borne fruit which is a blessing and salvation to the whole earth. He has also proved to us, that one who is poor, despised, and miserable in this world,

world, may, however, labour ſucceſsfully for the glory of the Almighty and the good of mankind.

LESSON CXVI.

THE BLESSINGS OF THIS LIFE GREATER THAN THE EVILS OF IT.

NOTHING is more calculated to comfort us in diſappointment and diſtreſſes, than the admitting it as a principle, that there is more good than evil in the world. Let us in reality conſult the moſt wretched of men, and aſk, if he can mention as many cauſes for complaint as he has motives for gratitude. It will appear, that, however great his misfortunes may be, they are not equal to the multitude of bleſſings he has received in the courſe of his life. To prove this truth more clearly, let us reckon the days we have paſſed in health, and the ſmall number in which we have been ſick: to the few vexations and ſorrows we experience in domeſtic and civil ſociety, let us oppoſe the many pleaſures they afford us; let us reckon the ſatisfaction we felt when we eſcaped any danger, or gained any victory over ourſelves, or had done any virtuous or ſenſible action; let us reckon all the bleſſings we remember to have enjoyed, and conſider, at the ſame time, that we can recollect but the ſmalleſt part of them; let us be convinced, that it is our being accuſtomed to bleſſings that makes us ſo ſenſible of evils, that new proſperity makes us forget the former, and that, if the impreſſions of our misfortunes are ſo deeply engraved in our memories, it is preciſely becauſe they ſeldom afflict us; let us compare the happy events we remember, though but the ſmalleſt part of what we have enjoyed, to the

the evils, the uſe of which we are not yet acquainted with. Wherefore, then, does man think ſo little of the continual proofs he receives of God's goodneſs? Why does he love to ſee the gloomy ſide of things, and torment himſelf with unſeaſonable cares and anxieties? Does not the Divine Providence ſurround us with pleaſing objects? Why then dwell always on our infirmities, on what we have not, and on the misfortunes which may happen to us? Why magnify them in our fancy, and perverſely turn our eyes from all that might make us eaſy and cheerful? The leaſt diſtreſs fixes our whole attention, while a long train of happy hours paſs away unobſerved. Let us baniſh opinions that muſt render us miſerable. Let us be ſully convinced, that God has beſtowed his bleſſings impartially throughout the world; and that no man has a right to complain, but, on the contrary, many juſt reaſons for praiſing and thankſgiving. Even the trials he now and then ſends us have moſt merciful views, which we ſhall one day acknowledge. His almighty and paternal hand protects us, and his eyes are ever upon us.

LESSON CXVII.

THE ENMITY BETWEEN ANIMALS.

THE eagle is a terror to the inhabitants of the air. The tyger lives by ſlaughter on the earth, the pike in the water, and the mole under ground. I know very well, that to ſome this plan appears cruel and wrong: but I will venture to maintain, that this very antipathy among animals is an excellent proof, that all is for the beſt; take them in the whole, and it is certainly an advantage that ſome ſhould ſubſiſt on others: for, on one hand, were it otherwiſe, a great number of ſpecies of them could

could not exiſt; and, on the other hand, it makes thoſe uſeful inſtead of hurtful. Inſects, and many reptiles, feed on carrion. Others fix in the bodies of certain animals, and live on their blood and fleſh; and thoſe ſame inſects ſerve as food to others. Carnivorous animals, and birds of prey, kill creatures to feed upon them. There are ſome ſpecies which multiply ſo very faſt, that they would be a burden to us, were there not a ſtop put to ſuch increaſe. If there were no ſparrows to deſtroy inſects, what would become of the fruit and flowers? Were it not for the ichneumon, which, as they ſay, ſeeks the eggs of the crocodile to deſtroy and break them, this terrible animal would probably become much too numerous. Great part of the earth would be a deſert, and many ſorts of creatures would never exiſt, were there no carnivorous animals. It may perhaps be ſaid, that they might live on vegetables; but if ſo, our fields would be ſcarce enough to feed the ſparrows and ſwallows. It would alſo be neceſſary to change the conſtruction of the carnivorous animal body for that purpoſe; and how could fiſh ſubſiſt, were they not to feed on the watery inhabitants? It is conſiſtent with the plan of the world, that one animal ſhould live on another: therefore the carnivorous animals are indiſpenſable links in the chain of beings: but, for this ſame reaſon, their number is ſmall in compariſon of uſeful animals. Alas! it muſt be confeſſed to the ſhame of humanity and Chriſtianity, that there are alſo among men fierce and cruel deſtroyers; with this difference, that their hoſtilities are more frequent, and that they often make uſe of more dark and ſecret means to hurt one another. The intention of God is, that every man ſhould make himſelf uſeful to his fellow-creatures, and, as much as poſſible, render their lives agreeable and happy; in a word, to do them all the good offices

offices in his power. Let us not oppoſe his merciful views, but endeavour to live in peace and harmony, following the example of our Saviour, in loving and endeavouring to make each other happy.

LESSON CXVIII. FORTIETH WEEK.

ON OUR INDIFFERENCE TO THE WORKS OF NATURE.

WHAT is the reaſon of our indifference and coldneſs in relation to the works of nature? An anſwer to this queſtion may give riſe to many important reflections. One of the cauſes of this indifference is *inattention*. We are ſo uſed to the beauties of nature, that we neglect to admire the wiſdom of him whoſe impreſſion they bear, and are not as grateful as we ought to be for the numberleſs advantages which reſult from them. There are but too many people as inſenſible as the beaſts which graze in the field, and drink of the ſtream, without reflecting from whence proceed the bleſſings they enjoy, and without acknowledging the goodneſs and wiſdom of him who beſtows them. Thus men, though endowed with the moſt excellent faculties, which enable them to enjoy a greater ſhare of nature's bleſſings, ſcarce ever think of the ſource from whence they flow. Many are cold in regard to the ſcenes of nature, from ignorance. How many are there who are unacquainted with the moſt common objects! They every day behold the ſun riſe and ſet. Their meadows are moiſtened ſometimes with rain or dew, and ſometimes with ſnow. The moſt wonderful revolutions happen before their eyes every ſpring, but they do not take the trouble to inquire into the cauſes and purpoſes of theſe ſeveral phenomena;

mena; and in that respect live in ignorance. It is true, that there always will be things incomprehensible to us, were we to study ever so much; and we are never more sensible of our limited understandings than when we undertake to search into the operations of nature. But we may at least acquire an historical knowledge of it; and the lowest ploughman may comprehend how it happens, that the seed he sows in the ground shoots and springs up, if he will take the trouble to inform himself of it. We generally value things according to our interest or fancy. Our self-love is so unreasonable, and we know so little our real interest, that we despise what is most useful to us. Corn, for instance, is most indispensably necessary to our subsistence, and yet we behold entire fields covered with this useful production of nature, without attending to it. Many neglect the contemplation of nature through indolence. They love ease and sleep too well, to take hours from them in order to contemplate the starry sky. They cannot resolve to rise early enough to behold the sun rise. They would dread the fatigue of stooping towards the ground, to observe what admirable art there appears in the formation of the grass. And yet these people, so fond of their ease, are full of zeal and activity when the indulgence of their passions is the object. A number of people despise the works of nature from irreligion. They have no taste for piety, or the obligations it prescribes. To praise God, to love him, and to acknowledge his blessings, are disagreeable duties to them. We have but too much reason to believe, that this is one of the principal causes of the indifference of mankind to the beauties of nature. If they were desirous of keeping the first and great commandment above all other things, they would take every opportunity of improving and increasing that know-

ledge. It is certain at leaſt, that very few ſtudy properly, or take a pleaſure in the works of Providence. Have we eyes, and ſhall we not contemplate the wonders which ſurround us on every ſide! Have we ears, and ſhall we not liſten to the hymns, which every part of the creation chaunts to the praiſe of the Creator!

LESSON CXIX.

UPON SEVERAL NOCTURNAL METEORS.

IN weather nearly ſerene, we often obſerve a circular light, or great luminous ring, round the moon, which we call halo, or crown. Its outline has ſometimes the faint colours of the rainbow in it. The moon is in the middle of this ring, and the intermediate ſpace is generally darker than the reſt of the ſky. When the moon is full, and much above the horizon, the ring appears more luminous. It is often of a conſiderable ſize. It muſt not be imagined that this ſort of crown is really round the moon. We muſt ſeek the cauſe of it in our atmoſphere, where the vapours occaſion a refraction of the rays of light which penetrate through them, and produce this effect. There appear ſometimes round, or, on one ſide of the real moon, ſome falſe ones, which we call mock-moons. Theſe are apparently of the ſame ſize of the moon, but their light is paler. They are ſcarce ever without circles, ſome of which are coloured like the rainbow, whilſt others are white, and ſeveral of them have long and luminous tails. Theſe alſo are but illuſions produced by refraction. The light of the moon falling on watery, and often on frozen vapours, refracts in different ways, and ſeparates into coloured rays, which reaching our eyes, double the image of the moon. Sometimes, though

though very ſeldom, we ſee by moon-light, after a heavy rain, a lunar rainbow, with the ſame colours as that of the ſolar, except that they are more faint. This meteor is alſo occaſioned by refraction. When ſulphurous and other vapours take fire in the higher atmoſphere, we often obſerve ſtreaks of light dart ſwiftly like rockets. When theſe vapours collect into a heap, take fire, and fall down, we think we ſee little balls of fire fall from the ſky; and as, at that diſtance, they appear as large as a ſtar, they are for this reaſon called falling ſtars. Some people fancy they are real ſtars, changing their place. Great balls of fire have alſo been ſeen more luminous than the full moon, with tails ſometimes trailing after them. They are brobably ſulphurous and nitrous vapours, which accumulate and take fire; for they generally traverſe the air with great rapidity, and frequently burſt with a great noiſe; and when the inflammable particles are of a very different nature, they diſperſe without noiſe in the upper regions of the atmoſphere. The little flaſhes ſeen in the ſummer evenings ſo often after great heats, are produced by the vapours in the atmoſphere. Theſe flaſhes, properly ſpeaking, are reverberations of lightning, which is at too great a diſtance for us to hear the clap of thunder attending it. Of all the nocturnal appearances, none is more remarkable and ſplendid than the aurora borealis. It is generally obſerved from the beginning of autumn till ſpring, when the weather is calm and ſerene, and when the moon does not give much light.—The aurora borealis is not always the ſame. It is uſually towards midnight that a light like the dawn of day appears. Sometimes we obſerve ſtreaks of light, white and luminous clouds, in a continual motion. But when the aurora borealis riſes in all its perfection, we generally ſee, if the weather be calm

and clear, towards the north, a dark ſpace, a black and thick cloud, the upper part of which is edged with a white luminous border, from whence dart rays, brilliant ſparks, and reſplendent pillars; which, as they riſe, every moment grow yellow and red; afterwards meet, unite, and form luminous thick clouds, which terminate at laſt in pillars of all colours, white, blue, orange, or the fineſt purple, from whence continual rays of light dart out; and it is then that this object is in its full ſplendour and beauty.

The meteors juſt mentioned render the long nights of the northern nations not only ſupportable, but even light and agreeable. When we behold theſe magnificent ſcenes, let us ſilently adore our Creator. The morn declares his majeſty; the hoſt of ſtars, and the mild light of the borealis, diſplay his greatneſs.

LESSON CXX.

AMPHIBIOUS ANIMALS.

BESIDES four-footed beaſts, birds, and fiſh, there is a ſort of animal which lives either in or out of water, and is on that account called Amphibious. They are all cold, and ſomething melancholy and forbidding in their look. Several of them are venomous. Inſtead of bones, they have only griſtles. Their ſkin is ſometimes ſmooth, ſometimes ſcaly. Almoſt all of them live by prey, which they obtain by cunning or ſtrength. They can in general ſupport hunger a long time, and live a hard life. Some of them walk, and others crawl; which forms them into two claſſes. To the former thoſe with feet belong. The tortoiſes, which are of that claſs, are covered with a ſtrong ſhell like a ſhield. The land-tortoiſe is the ſmalleſt.

Some

Some ſea tortoiſes are five yards long and weigh from eight to nine hundred pounds. There are different ſorts of lizards; ſome ſmooth, others ſcaly; ſome with wings, and ſome without. Among theſe we reckon the crocodile; and the chameleon, which lives on flies, ſpiders and inſects. Of all animals the crocodile is the moſt dreadful. This amphibious creature, which comes out of an egg not larger than the egg of a gooſe, grows ſometimes from twenty to thirty feet long. It is voracious, cunning, and cruel. Serpents form the ſecond claſs of amphibious creatures. They have no feet, but crawl, with a ſort of winding vermicular motion, by means of ſcales and rings with which their bodies are covered. Their back-bones are conſtructed in a particular manner favourable to this motion. As the ſerpents can ſtretch their jaws conſiderably, they ſometimes ſwallow animals thicker than their own heads. Some kind of ſerpents have fangs in their mouths which they extend when ſeizing their prey; and it is by this means that they ſlip poiſon into the wounds they make, which comes out of a bag placed at the root of the fangs. The ſerpents provided with the arms juſt mentioned, make but a tenth part of the whole ſpecies; all the others are not venomous, though they attack men and animals with as much fury as if they could hurt them. The rattleſnake is the moſt dangerous of any. It is generally three or four feet long, and as thick as the thigh of a full grown man. Its ſmell is ſtrong and offenſive. It ſeems as if nature had given this, as well as the rattle, to this creature, in order to warn mankind of its approach. It is never more furious and dreadful than when it rains, or when hunger torments it. To roll itſelf up, to reſt upon its tail, to dart upon its prey, to give the wound, and to retire again, is to the ſerpent the affair of a

moment, as it never bites till it rolls itſelf up: dreadful as the rattleſnake is, it cannot conceal its approach. It is alſo remarkable, that Providence has oppoſed to this animal an enemy which can conquer it: the ſea-hog every where ſeeks the rattleſnake to devour it, and a child is ſtrong enough to kill the moſt terrible of theſe reptiles: a very ſlight blow with a ſtick upon its back kills it inſtantly, or at leaſt in a quarter of an hour. How unjuſt alſo would it be to conſider nothing but the miſchief theſe do us, without reflecting on the advantages reſulting from them? Some ſerve for food; others ſupply us with medicine, and the tortoiſe, for its ſhell, is of very great uſe. In a word, the wiſdom and goodneſs of God appears in this, as in every thing elſe.

LESSON CXXI. FORTY-FIRST WEEK.

THE FACULTY OF SPEECH HOW VALUABLE IF NOT ABUSED.

THERE is nothing extravagant in all that has been ſaid to enhance the value of the gift of ſpeech. It is in reality the higheſt prerogative of man, and places us in a rank very ſuperior to animals: for whatever traces may have been remarked in them of ſounds to expreſs their wants, &c. this can never be compared to human ſpeech, which ſerves us to purſue a courſe of converſation, introducing all ſorts of ſubjects, to communicate to others our ideas, and to carry on the thread of argument from its ſource to the moſt remote concluſions. The rules of converſation may be reduced to three heads: it ought to be a means of inſtruction, a bond of ſociety, and a ſource of pleaſure. Inſtruction is the firſt thing a man requires on entering into the world.

world. If he is not then as a blank paper, the characters at leaſt that are traced in his mind are ſo ſuperficial and confuſed, that he wants aſſiſtance to make them clearer, and to impreſs them more ſtrongly. Accordingly, the converſation of the firſt years of our life are moſtly devoted to inſtruction; we aſk the queſtions which our curioſity ſuggeſts from every new object, and each anſwer, regiſtered in our brain, increaſes our ſtore of ideas. But the age of infancy, or even of youth, to which we limit this ſort of converſation, is not enough. There is no time of life in which we may not obtain information. A ſenſible man may draw ſome out of every converſation, by leading others to ſpeak on ſubjects they are beſt acquainted with, and which he himſelf does not know. We meet perſons who have travelled, who have been witneſſes to certain intereſting events; it is in our power to gain all they know, and will only coſt us a little attention. We converſe with a friend, whoſe courſes and ſtudies agree with our own. What can we do better than to communicate our ideas mutually, to aſſiſt each other in our common inquiries, and to reſolve together the difficulties which may embarraſs us. It has been often ſaid and proved, that the condition of men would be moſt deplorable, without the ſweets of ſociety. But what enables us to form ſocieties? It is ſpeech and converſation. Recreation is an eſſential part of life, as it gives us ſtrength to fulfil the duties of it: none ſo natural, or ſo much within the reach of all the world, as engaging converſation, which makes time fly ſweetly, and leaves the mind cheerful and compoſed. But is it thus that men converſe? Are theſe rules obſerved? Alas, they are but too much neglected; and, with grief, I am going to ſhew the bad effects of it. Who is there that ſeeks information from ſociety? Thoſe firſt years, devoted to ſtudy, are ſcarce over, when a

young man, impatient of reſtraint, ſhakes off the yoke. He is aſhamed to ſeem ignorant of any thing, and takes great care to avoid the leaſt appearance of diffidence, which might give ſuſpicion there was any thing in the world he did not know. One infallible means of pleaſing in ſociety, is a reflection with which I ſhall cloſe this diſcourſe. It is to carry with us a conſtant diſpoſition to appear intereſted in all that others ſay to us, to liſten to them with an air of ſatisfaction, and never to interrupt them in order to ſpeak of ourſelves. This will never fail. Any one that follows this maxim will, without much trouble or wit, be more liked than the moſt brilliant genius. I do not, however, lay it down as a precept, to reſtrain one's ſelf continually for thoſe who will make no return; we are not obliged to do it. It is true, it would make us pleaſing in ſociety, but ſhould we ourſelves be pleaſed? It is only by an unanimous conſent of men deſirous of information, ſcrupulous not to offend their neighbours, and attentive to pleaſe, that we can hope to ſee thoſe abuſes baniſhed, and thus to make a rational uſe of a faculty intended to ennoble and to bleſs mankind.

LESSON CXXII.

THE EFFECTS OF FIRE.

NOTHING in nature can exceed the violence of fire; nor can we, without aſtoniſhment, reflect on the effects it produces, and the extreme ſwiftneſs of its operations. There is one effect of fire which falls within every one's knowledge, that of dilating the bodies it penetrates. Irons put into a metal plate while they are new, ſwell ſo much in the

the fire, that they go in with difficulty; but as ſoon as they are cold, they are very eaſily taken out. This dilation produced by fire is ſtill more viſible in fluid bodies, ſuch as wine, beer, and particularly in the air. If it were not for this property, the thermometer, by which we calculate the different degrees of heat, would be quite uſeleſs. Obſerve the effect of fire on inanimate and compact bodies; how ſoon it melts and changes them, part into fluid matter, and part into a ſolid, of a different ſort. It communicates fluidity to water, oil, fat, and to almoſt all metals. What renders theſe bodies ſuſceptible of this change is, that their combination is more ſimple, and the parts which compoſe them are more homogeneal than in other bodies; therefore the fire penetrates the more eaſily into their pores, and ſooner ſeparates the parts. This alſo cauſes theſe kind of ſubſtances to evaporate when the fire penetrates in great quantity, and with violence, through them. Some ſolid bodies undergo other ſorts of changes. Sand, flint, ſlate, and ſpar, vitrify in the fire; while clay turns into ſtone. Marble, calcareous ſtones, and chalk, turn into lime. The variety of theſe effects does not proceed from fire, but from the different properties of the matter on which the fire acts. It may produce three ſorts of effects on the ſame body, that of melting, vitrifying, and reducing to lime, provided the body be compoſed of the three ſeveral matters. The fire of itſelf produces nothing new; it only diſcovers parts which were concealed in thoſe bodies. As for fluids, the fire operates in two ways upon them. It makes them boil and reduces them to vapours. Theſe vapours are formed of the moſt ſubtile parts of the fluid, joined with particles of fire. They riſe up because they are lighter than the air. In regard to living creatures, fire produces throughout their whole bodies the ſenſation of warmth. The life of man

could not be preſerved without this element, as we require a certain quantity of fire in our blood to keep it in motion. We every moment breathe new air, in which there is always ſome fire neceſſary to preſerve this warmth and motion; whilſt, on the other hand, we reject the air, which had loſt its ſpring in our lungs, and was loaded with ſuperfluous humours. How many advantages accrue to us from the effects of fire only! By the union of fire and air the ſeaſons return; the moiſture of the ſoil, and the health of man are preſerved. By means of fire, water is put in motion, without which it would ſoon looſe is fluidity. By the gentle motion it keeps up in all organized bodies, it gradually brings them to perfection. It preſerves the branch in the bud, the plant in the ſeed, and the embryo in the egg. It prepares our food properly. It contributes to the formation of metals, and makes them fit for uſe. In fine, when we collect together the ſeveral properties of fire, we find, that the Creator by that means has ſpread a multitude of bleſſings over our globe; a truth which ought to make great impreſſion on our hearts, and teach us to love the Author of our being, and inſpire us with contented minds. The more we ſearch into the nature of things, the more we diſcover that all concur to the moſt perfect end. We every where behold magnificent plans, admirable order, conſtant harmony between the parts and the whole, between the ends and the means.

LESSON CXXIII.

THE INEXHAUSTIBLE RICHES OF NATURE.

NATURE is ſo bountiful to us, ſo abundant in means to ſupply the wants of every creature, ſo rich in gifts, that they can no more be numbered than

than the drops of the ocean. How many things does one ſingle man require, during a life of ſixty years, for his eating, drinking, and clothing, and for the ſweets and conveniences of life, for pleaſure, amuſement, and ſociety, without mentioning extraordinary caſes and unforeſeen accidents? From the king to the beggar, in all ſituations, conditions, and ages of men, from the infant to old age, in every country, and according to the different manners of the people, each man has his particular wants. What ſuits one will not ſuit another; and they all require different means of ſubſiſtence. Yet we find that nature can anſwer all theſe demands, and that each individual is ſupplied with all the neceſſaries of life.—Since the firſt exiſtence of the world, the earth has never failed to open her boſom. The mines have never been exhauſted. The ſea affords ſubſiſtence to numberleſs creatures. The plants and trees conſtantly bear ſeed, which ſhoots in due ſeaſon, and becomes fruitful. Beneficent nature varies her riches, that one place may not be too much exhauſted; and when ſome ſorts of plants or fruit begin to diminiſh, others are produced; and it is ſo ordered, that the inſtinct and taſte of mankind ſhould lead them to the moſt abundant productions. Nature is a wiſe economiſt, and takes care that nothing is loſt. Inſects ſerve as food for larger animals, which in their turn are uſeful to man. If they do not afford us food, they furniſh us with clothes, with arms, and means of defence; and if for none of theſe, they at leaſt ſupply us with ſalutary medicines. Even when diſeaſes ſweep off ſome ſpecies of animals, nature repairs the loſs by the increaſe of others. Not even the duſt, the carrion, or putrid corrupted matter, but has its uſe, either as food for inſects, or for manure to enrich the earth. How beautiful is nature! Her fineſt clothing requires only light and colours. She is abund-

antly provided with them; and the ſcenes ſhe preſents are continually varied, according to the points of view in which they are ſeen. Here the eye is ſtruck with the beauty of form; there the ear is charmed with melodious ſounds; and the ſmell is indulged with agreeable perfumes. In other places art adds new embelliſhment to nature, by a thouſand induſtrious works. The gifts of nature are ſo abundant, that even thoſe which are continually made uſe of never fail. Her riches are ſpread over the whole earth. She varies her gifts according to the different countries. By means of commerce, ſhe connects different nations; and the hands through which her gifts paſs, make them more valuable by the continual circulation. She combines and mixes her gifts as the phyſician does his medicinal ingredients. The great and the ſmall, the handſome and the ugly, the old and new, combined and mixed with art, form one whole equally uſeful and agreeable. Such are the inexhauſtible riches provided by the great Creator.

LESSON CXXIV. FORTY-SECOND WEEK.

PETRIFACTIONS.

THE tranſmutation of ſeveral ſubſtances from the animal and vegetable kingdom into the mineral, is a circumſtance in natural hiſtory well worthy our attention. The firſt thing to remark in petrifactions is their exterior form, which ſhews, that theſe foſſils have undoubtedly belonged either to the animal or vegetable kingdom. It is very unuſual to find human petrifactions, or thoſe of quadrupeds. The moſt extraordinary ſkeletons met with in the earth, are thoſe of elephants, which are found

found even in many parts of Germany. Petrifactions of aquatic animals are frequently met with. There are ſometimes fiſh entirely whole and perfect, even to the ſmalleſt ſcales: but this is nothing in compariſon of the multitude of ſhell-fiſh, and little worms found changed into ſtone in the bowels of the earth: there are more different ſpecies of them than are to be found alive. Sea-petrifactions are found in great abundance all over the world. There are ſome on the tops of mountains, and quantities are found in the earth, at different depths. All ſorts of petrified plants, or pieces of plants, are met with in ſeveral beds of the earth; but there is often the impreſſion only, the bodies themſelves being deſtroyed. In many places whole trees are found buried more or leſs deep into the earth, and turned to ſtone. Theſe do not appear to be old petrifactions. But how have all theſe petrified ſubſtances got into the earth, and particularly how can they have got upon ſuch high mountains? How have ſea-animals been tranſported ſo far from their natural abode? Different cauſes may be aſſigned for this. Perhaps theſe petrifactions prove, that the greateſt part of the earth was formerly covered with water. And indeed, as in every place where we ſearch, from the top of the mountain to the greateſt depths, into the earth, all ſorts of marine productions are found, it ſeems as if it could not otherwiſe be accounted for. We have hitherto but a very imperfect knowledge of the manner in which nature operates in theſe petrifactions. It is certain that nothing will petrify in the open air; for the bodies of animals or vegetables conſume or corrupt in this element; ſo that air muſt be excluded, or at leaſt not act, where petrifactions are formed. Neither has a barren dry earth any petrifying quality. Running water may form a cruſt on particular bodies, but cannot turn them into ſtone;

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the very courſe of the water prevents it. It is probable, therefore, that petrifactions require moiſt ſoft earth, mixed with diſſolved ſtony particles. The ſtony juices penetrate into the cavities of the animal body, or the vegetable; they impregnate and unite with it, in proportion as the parts of the body itſelf evaporate, or as they are abſorbed by alkaline ſubſtances. We may draw ſome inferences from thence, which explain theſe phenomena of nature. All animals and vegetables are not equally capable of being turned to ſtone; for, in order to be ſo, they require a degree of hardneſs, to prevent them from corrupting before they have time to petrify. Petrifactions are generally formed in the earth, and require that the places where the bodies are placed ſhould be neither too dry nor too wet. All ſorts of ſtones which contain petrifactions are the work of time, and conſequently they are every day ſtill forming; ſuch as chalks, clays, ſands, the magnet, and others. The petrified bodies take the nature of theſe ſtones, and become ſometimes chalky, ſometimes like ſlate, &c. If petrifactions were of no other uſe than to throw light upon the natural hiſtory of our globe, they would from that circumſtance alone be worthy our attention: but we may alſo conſider them as proofs of the operations and tranſmutations which nature produces in ſecret; and here again appears moſt wonderfully the power and wiſdom of God.

LESSON CXXV.

EVERY THING IN NATURE IS GRADUAL.

WE may obſerve in nature an admirable gradation, or inſenſible progreſs, from a ſimple to a more compound perfection. There is no mid-

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dle ſpecies which has not ſomething of the nature of that which precedes or that which follows it. In a word, there is no void or leap in nature. Duſt and earth form the principal and the component matter of all ſolid bodies. It is accordingly found in all thoſe which human art has analyzed. From the mixture of ſalts, oils, ſulphur, &c. with the earth, there reſult different kinds of ſoil, more or leſs compound, light or compact. This naturally leads us to minerals. The variety of ſtones is very great; their form, colour, ſize, and hardneſs, are very different. All ſorts of metallic and ſaline particles are found in them; and from hence proceed mineral and precious ſtones. In the laſt claſs of ſtones, there are ſome with fibres, and a ſort of leaves; ſuch as ſlate, talc, the lithophites, or marine ſtony plants, and the amianthus, or the ſtony flower of the mine; which leads us from the minerals to the vegetables. The plant which appears to be the loweſt among the vegetables, is the truffle. Next comes the numerous ſpecies of muſhrooms and moſſes; between which the hoar or mould ſeems to take its place. All theſe plants are imperfect, and, properly ſpeaking, only form the limits of the vegetable world. The more perfect plants divide into three ſorts, which are diſperſed over the whole earth; graſs, ſhrubs, and trees. The polypus ſeems to unite the vegetable to the animal race. From the outward appearance, this ſingular production would only be taken for a plant, if it was not known to perform real animal functions. This zoophite forms the link between plants and animals. Worms are the loweſt of the animals, and lead us to inſects. Thoſe worms which have their bodies encloſed in ſhells, ſeem to unite inſects to ſhell-fiſh. Between them, or rather next to them, come reptiles; theſe, by means of the water-ſnake, are linked with the fiſh. The flying-fiſh leads us to the bird-

bird-ſpecies. The oſtrich, which has legs ſomething like a goat's, and which rather runs than flies, ſeems to link the birds with the quadruped. The ape joins hands with man and beaſt. There are gradations alſo in human nature, as well as in every thing elſe. Between the moſt perfect ſtate of man and the ape, there are a wonderful multitude of links; how many more ſtill are there between men and angels!

What has been ſaid is ſufficient to ſhew, that every thing in the univerſe is cloſely linked together. There is nothing without deſign; nothing which is not the immediate effect of ſomething which preceded it, or which does not determine the exiſtence of ſomething which is to follow. Nature goes by degrees, not ſuddenly, from the component to the compound, from the leſs to the more perfect, from the neareſt to the more diſtant, from the inanimate to the animate, from bodily to ſpiritual perfection. From the grain of ſand to the cherubim, every thing owes its exiſtence and perfection to the great Author of the univerſe.

LESSON CXXVI.

DIFFERENT SORTS OF EARTH.

WE can only form conjectures of the inſide of the earth. Thoſe who work in the mines have never been able to go lower than 900 feet. If they attempted to go further the too great preſſure of the air would kill the men, ſuppoſing even they could protect themſelves from the water. which fills more and more in proportion as they deſcend lower. The inſide of the earth muſt conſequently be in a great meaſure unknown to us. The labours of the miners have ſcarce even reached below the firſt coat of

of it. All that we know is, that when they dig ſome hundreds of feet, this coat is found to be compoſed of ſeveral different layers or beds placed one over another. Theſe beds are much mixed; and their direction, ſubſtance, thickneſs, and reſpective poſitions, vary conſiderably from one league to another. Generally under the common earth in gardens they find white clay and rich earth; but ſometimes the ſand, clay, and marl mix by turns. In comparing the obſervations which have been made, the beſt account appears to be that which divides them into ſeveral ſorts of earth.

Black earth is compoſed of putrid vegetable or animal ſubſtances; it contains ſalts and inflammable matter: this is, properly ſpeaking, dung. White clay is more compact than the black earth, and retains water on its ſurface longer. Sandy ground is hard, light, and dry; it does not retain water, or diſſolve in it. Marſhy ground contains ſalt of vitriol, which is too ſharp for the plants. Chalk is dry and hard; ſome plants, however, grow in it: there grow ſome even in ſtony ground. The ſmootheſt ſtones, however bare of earth, are at leaſt covered with moſs, which is a vegetable; and we ſee birch growing between the ſtones and in the crevices of rocks to a conſiderable height. The Creator has moſt wiſely prepared thoſe different ſorts of earth of which the beds are compoſed: for, to mention nothing more than the principal advantages which reſult from them, theſe ſeveral beds of ſand, gravel, and light earth, give paſſage to ſpring water, which filters in running over theſe beds, becomes ſoft, and then, diſperſing on every ſide, ſupplies water for general uſe: thoſe beds are the reſervoirs of ſprings. It is remarkable that they are to be found in every country on the ſurface of the earth, and that they are generally compoſed of a light earth. If it is ſometimes mixed with a harder

harder and more gravelly ſoil, it purifies the water ſo much the more. This variety of ſoil is very uſeful alſo for vegetables. It is from this circumſtance that herbs, plants, and trees grow of themſelves in ſome countries, while they can only be produced by art in others. All that art can do is to imitate nature, which prepares for the plants that come of themſelves the ſoil, the nutritive juices, and the warmth, moſt proper for them. The variety of ſoil will make herbs, trees, and roots, though of the ſame kind, differ according to the ſoil they grow in. It often happens in the ſame ſoil, that ſome plants thrive, whilſt others fail. The ſame fruit has a different flavour in one country from what it has in another.

Theſe obſervations lead us to acknowledge the wiſdom with which the Creator has prepared every ſoil for the production of plants, for the good of his creatures.

LESSON CXXVII. FORTY-THIRD WEEK.

MIGRATION OF THE BIRDS.

THIS is the time when numbers of the birds, which during ſummer had lived and found food in our fields, woods, and gardens, are going to quit our climate for other countries. There are but few of them which paſs the winter with us; the woodpecker, the crow, the raven, the ſparrow, the wren, the partridge, and the thruſh: the reſt leave us almoſt the whole winter. This migration is wonderful in all reſpects; and if we have not much attended to theſe creatures while they were with us, let us at leaſt think of them now they are gone. Some birds without taking their flight very high, and

and without ſeparating from one another, drawing gradually towards the ſouth, to ſeek the ſeeds and the fruit they prefer; but they ſoon return back. Others, which are called birds of paſſage, collect together at certain ſeaſons, go away in large bodies, and take their flight into other climates. Some kinds of them are content with going from one country to another, where the air and food draw them at certain ſeaſons. Others croſs the ſeas, and undertake voyages of a ſurpriſing length. The birds of paſſage moſt known, are quails, ſwallows, wild ducks, plovers, woodcocks, and cranes, with ſome others which feed on worms. The quails in ſpring go from Africa into Europe, in order to enjoy a more moderate heat: they go in flights, and look like clouds: they often fall through fatigue into ſhips, and are eaſily taken. The method of the ſwallows is different; ſome croſs the ſeas, but many of them ſtay in Europe, and hide themſelves in holes under ground or in marſhes. Wild ducks and cranes alſo, at the approach of winter, ſeek milder climates. They all aſſemble on a certain day, and divide company. They generally form themſelves into two lines united in a point, as < thus, with a bird at their head, and the reſt in rows, which always extend in that manner. The duck, or crane, which forms the point, cuts the air, and makes way for thoſe which follow; and theſe always lay their bills on the tails of thoſe which go before: the leading bird is only charged with this commiſſion for a time: he goes from the point to the tail, in order to reſt, and he is relieved by another. But all birds of paſſage do not aſſemble in flights. Some take the voyage quite alone; others with their mates, and all their family; others in ſmall numbers. They make their paſſage in a very ſhort time. It has been computed that they may eaſily fly 200 miles in flying only ſix hours a day, ſuppoſing

ſuppoſing them to reſt now and then in the day as well as at night. According to this calculation, they might fly from our country even as far as under the line, in ſeven or eight days. This has been verified, as ſwallows have been ſeen on the coaſts of Senegal, on the ninth of October, which is eight or nine days after their departure from Europe. Theſe migrations of the birds cannot be too much admired. Certainly the difference of heat and cold, and the want of food, warns them to change place. But what is the reaſon, that when the air is ſo mild that they might remain in it, and that they find enough to eat, they ſtill never fail to go at the appointed time? How do they know that they will find food, and the proper degree of heat in other climates? What is the cauſe of their going all at the ſame time out of our countries, as if they had unanimouſly fixed beforehand their day of departure? How do they contrive in dark nights, and without knowing the countries, to purſue their direct road conſtantly? Theſe and other queſtions on this intereſting ſubject, are embarraſſing, and have not yet been anſwered in a ſatisfactory manner, becauſe we are not enough acquainted with the nature and inſtinct of theſe animals. We may, however, behold in theſe migrations the wiſe and beneficent direction of Providence. What wonderful means are made uſe of to preſerve and give food to certain birds! With what tender care is their ſubſiſtence pointed out to them, when it fails them in ſome regions! Let us learn from thence, that every thing throughout the vaſt empire of nature is planned with infinite wiſdom. Is not inſtinct to the birds of paſſage what reaſon is to man? And does it not equally inſtruct them in this point, of changing place in proper ſeaſons? How ought we to bluſh at our incredulity, our doubts, and our anxieties,

anxieties, when we reflect on the admirable guidance of Providence!

LESSON CXXVIII.

THE VARIETY OF TREES.

THERE is the ſame variety among the trees as in the vegetable productions. Some are diſtinguiſhed by their ſtrength and roughneſs, like the oak; others are tall and ſlender, as the elm and the fir-tree: there are ſome, ſuch as the thorn and the box, which never grow high: ſome have rough and uneven coats, while others are ſmooth and fine, like the birch, the maple, and the poplar. Some are made uſe for ornaments in rich apartments, while others ſerve for common and more neceſſary purpoſes: ſome are ſo ſlight and delicate, that the leaſt wind might blow them down; others ſtand unſhaken, and reſiſt the violence of the northern blaſts: ſome grow to a prodigious height and thickneſs, and every year after they are an hundred years old, ſeems to add to their circumference; while others require but a very few years to come to their full growth. Pliny, in his time, admired thoſe great trees, the ſhell or bark of which was thick or large enough to be made into ſloops to hold thirty people: but what would he have ſaid of thoſe trees in Congo, which, when hollowed out, make veſſels to contain 200 men: there are ſome of this kind at Malabar, which are ſaid to be forty feet in circumference: the cocoa-tree is one of them, a ſort of palm-tree, ſome of which have leaves large enough to cover twenty people. The tullipot, a tree which grows in the iſland of Ceylon, and for height reſembles the maſt of a ſhip, is equally famous for its leaves. They are ſo immenſe, that it is ſaid

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that one ſingle leaf can ſhelter fifteen or twenty men from the rain. They are ſo ſupple when dried, that they may be folded up like fans, and are then extremely light, and appear no larger than a man's arm. There are ſtill on mount Libanus, twenty-three old cedars, which are ſaid to have eſcaped the deluge: a learned perſon who ſaw them, aſſures us, that ten men could not encompaſs one of thoſe cedars; they muſt therefore be thirty or thirty-ſix feet in circumference, which does not appear too much for trees ſome thouſands of years old. The gum-trees which grow in the iſlands of America are generally twenty-ſix feet in circumference. It is not likely, then, that the cedars are as old as they ſay; though it is certain that trees live to a great age. There are apple-trees above a thouſand years old; and, if we compute the quantity of fruit ſuch a tree bears annually, we muſt (as has been before mentioned) think with aſtoniſhment of the prodigious fertility of a ſingle pippin, which could furniſh all Europe with trees of this kind.

The great variety among trees reminds me of the difference we obſerve among men, in regard to their ſituations in life, their way of thinking, their talents, and the good they do. As there is not a ſingle tree in a foreſt which may not be of ſome uſe to its owner, ſo there is no one in ſociety which may not be uſeful. One, like the oak, gives an example of firmneſs, and of unſhaken conſtancy, which nothing can move: another has not equal fortitude, but has more complaiſance, and conforms to others; he is flexible as the willow, and yields to a breath of wind: if he is virtuous, he will only comply in lawful and innocent points; but if he is indifferent to his duties, he will always embrace the ſtrongeſt ſide. How different the trees may be from one another, they all belong equally to the Sovereign of the world; all are nouriſhed by the ſame earth, all warmed

warmed by the ſame ſun, and refreſhed by the rain equally. Oh! that all men, however different from each other, would unite in acknowledging that they are all equally God's creatures, equally ſubject to his power, equally the object of his tender mercies; all indebted to him for their exiſtence and ſupport, as well as for the talents with which they are endowed.

LESSON CXXIX.

THE TEMPERATURE IN THE DIFFERENT CLIMATES OF THE EARTH.

IT ſeems as if the temperature and warmth of countries muſt depend on their ſituation in reſpect to the ſun, as it caſts its rays in the ſame manner on all countries which are in the ſame latitude. But experience tells us, that heat and cold, and all the temperature, depend on many other circumſtances. Seaſons may be very different in places under the ſame parallel; and are, on the contrary, often very much alike under very different climates. Therefore, as accidental cauſes may make the heat very different in the ſame latitude, and as it is very far from being ſuch as the diſtance of the ſun would ſeem to promiſe, it is difficult to determine exactly the ſeaſons and temperature of each country. The neighbourhood of the ſea renders the climate milder. England and the coaſts of Norway are ſtrong proofs of it: the ſea may be covered with ice near the ſhore, becauſe it mixes there with freſh water: but it never happens at any conſiderable diſtance from land, both from the ſalt, of which the ſea is full, and from its being in continual motion. By the ſea not being frozen in winter, the climate of the adjacent countries is milder. On the contrary, the higher

higher a place is above the ſea, the colder it is. The air is not only thinner there, and conſequently contains leſs warmth, but the greateſt part of the heat produced by the earth's reflecting the rays of the ſun falls on low places and valleys, and does not reach heights. Quito is almoſt under the line, but the heat is moderate from its high ſituation. In general, thoſe ſort of countries have ſerene and clear air, and an equal temperature. High mountains attract clouds, which occaſion more frequent rains and ſtorms in hilly countries than elſewhere; and it has been obſerved, that it ſcarce ever rains in the plains of Arabia. Countries where there are great extenſive foreſts are very cold: the ice melts more ſlowly there in winter, becauſe it is covered with the ſhade of the trees. The ice makes the upper air cold, and this delays the thaw. Another circumſtance alſo tempers the heat of warm climates; their days are not long, and the ſun does not remain long above the horizon. In colder countries the ſummer days are very long, which makes them warmer than could be expected. The ſerenity of the ſky, the clear light of the moon, and the long twilights, render long nights ſupportable. Under the torrid zone, the ſeaſons are not ſo much diſtinguiſhed by winter and ſummer, as by dry and wet weather; for when it ought to be ſummer, that is, when the ſun is moſt above the horizon, and its rays fall in as direct a line as poſſible, then come the rains, which fall more or leſs for ſome time. But in thoſe countries, the moſt pleaſant ſeaſon is that in which the ſun is at the loweſt. In the countries beyond the tropic, the weather is generally more uncertain than within the tropic. It is in ſpring and ſummer that the winds are higheſt. In winter the ground freezes more or leſs deep, but ſeldom in our climate more than three feet. In more northern countries, it freezes deeper in winter, and only

thaws

thaws a few feet in ſummer. Stagnant waters, and even rivers, are covered with ice, firſt near the ſhore, and then over the whole ſurface of the water. The different qualities of the ſoil, as they retain more or leſs of acquired heat, contribute alſo in ſome degree to vary the climate.

In thus regulating the ſeaſons and climates of the different countries, the Creator has made every part of the earth habitable: and to the great ſatisfaction of all feeling hearts, it is certain, that the people of the moſt diſtant countries, without even excepting thoſe who live under the line or under the pole, enjoy the portion of happineſs ſuited to their nature and deſtination. Each country has its advantages and inconveniences, in ſuch equal proportion, that it would be difficult to decide which of them merits the preference. There is not a corner of the world in which the Almighty has not diſplayed his goodneſs.

LESSON CXXX. FORTY-FOURTH WEEK.

ATMOSPHERE OF THE EARTH.

THE air which ſurrounds the earth is not as pure and ſubtile as ether; for it is loaded with all the particles or vapours which are continually riſing out of the earth, and particularly from the water: this is called atmoſphere. Its lower region, that is to ſay, what is neareſt to the earth, is preſſed upon by the upper air, and from thence becomes more thick and denſe. This is experienced by thoſe who go to the top of high mountains. Their breathing becomes more painful in proportion as they aſcend. But it is impoſſible to aſcertain the exact height of the atmoſphere, be-

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cauſe we cannot riſe very high in the air.—The atmoſphere is divided into three regions. The lower one reaches as high as where the air receives no warmth from the rays which the earth reflects. The middle region begins where the preceding one ends, and goes as high as the higheſt mountains, or even as far as the higheſt clouds, and in the ſpace where the hail, rain, and ſnow collect. This region is much colder than the lower; for it is only warmed by the rays which fall perpendicularly, and in a direct line upon it. But the third is probably ſtill colder. It reaches from the middle to the extremity of the atmoſphere, and we cannot preciſely aſcertain its limits.

The particles which riſe out of the earth, and form the atmoſphere, are of different natures. They are watery, earthy, metallic, ſulphurous, &c. Now, as ſome abound more than others in certain parts of the earth, it occaſions great variety in the air, and this difference is very perceptible even at a little height. A heavy air is more wholeſome than a light one, becauſe it promotes the circulation of the blood, and inſenſible perſpiration. When the air is heavy, it is generally ſerene; whereas a light air is always attended with clouds, rain or ſnow, which makes it damp. Vapours increaſe the weight of the air; and particularly, when the heat ſends them up very high, the air is ſtill light, notwithſtanding the watery vapours with which it is filled. The beſt air, therefore, is that which is rather heavy than light, neither too dry nor too moiſt, and but little or not at all mixed with noxious vapours. It is in the atmoſphere that the clouds, the rain, ſnow, dew, thunder, and ſeveral etherial phenomena, are formed. It is to the atmoſphere alſo that we owe the morning and evening twilights. As the rays break and bend in this maſs of air, we ſee them before the

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ſun appears, and we enjoy them after it has ſet. Let us then acknowledge with gratitude the wiſdom and goodneſs of the Creator, who has regulated every thing in nature, ſo as to be moſt conducive to the happineſs of the beings he has formed.

LESSON CXXXI.

BEASTS OF BURDEN.

THESE ſort of animals do us ſo much ſervice, and are ſo uſeful to us, that it would be ungrateful not to examine them with care. Of all domeſtic animals, it is the horſe which does us moſt ſervice, and does it the moſt willingly. He lets himſelf be employed to cultivate our ground; he brings us all our wants; he ſubmits tamely to every ſort of labour, for a frugal and moderate ſubſiſtence. Giving himſelf up entirely to his maſter, refuſing him nothing; makes uſe of all his ſtrength, exhauſts himſelf, and even dies in trying to do more. Nature has given the horſe a propenſity to love and fear mankind; and made it very ſenſible to the careſſes which render its ſervitude pleaſing. The horſe is the beſt proportioned and fineſt ſhaped of all the animals. Every part of him is elegant and regular. The exact proportions of his head give him a light and lively look, which is ſtill heightened by the beauty of his cheſt. His carriage is noble, his ſtep majeſtic, and every limb ſeems to mark animation, ſtrength, courage, and pride. The ox has not the pleaſing elegance of the horſe; but it compenſates for theſe by the important ſervices it does to mankind. It is ſtrong enough to draw heavy loads, and is content with poor food. Its blood, its hide, fleſh, fat,

and horns may be applied to ſeveral uſes; and its dung is excellent manure for the ground. A very remarkable circumſtance in this animal is the conſtruction of its organs of digeſtion. It has four ſtomachs, the firſt of which can contain forty or fifty pounds weight of food. The third ſtomach has eighty-eight folds or ridges, which ſerve to digeſt, whilſt ſheep or goats have but thirty-ſix. The aſs, however void of beauty in its appearance, and however deſpiſed it may be, has notwithſtanding many excellent qualities, and is very uſeful to us. It is not fiery and impetuous like the horſe; but quiet, ſimple, and always the ſame. It has no pride. It goes ſmoothly on. It carries its load without noiſe or murmur. It is temperate, both as to the quantity and quality of its food. It is contented with thiſtles, and the hardeſt and worſt herbs. It is patient, vigorous, and indefatigable; and is of continual and eſſential uſe to its maſter.

How is it poſſible that we can daily make uſe of theſe animals, without reflecting on the Creator, who formed and gave them the means of being ſo uſeful to us? It is a circumſtance worthy the attention of a reflecting mind, that the number of beaſts of burden is infinitely greater than that of wild beaſts. If the latter multiplied as faſt as the former, the world might ſoon be a deſert. Can we reflect without gratitude on that goodneſs which has given us the command of thoſe animals; the ſtrength or ſkill to ſubdue them; the right to make uſe of them; to change as we pleaſe their nature; to force them to obedience; and to employ them as we chooſe. If animals had not been impreſſed with a natural fear of mankind, it would be impoſſible to ſubdue them by force. Since therefore it is to God alone we owe our power over them, we ſhould not abuſe it by treating thoſe creatures ill.

LESSON

LESSON CXXXII.

THE WINTER SOWING TIME.

GREAT part of the food deſtined for us, and for many animals, is at this time depoſited in the ground. The farmer has ſowed his winter corn, and begins to enjoy reſt from his labours. He will ſoon have the ſatisfaction to ſee his fields gradually covering with a beautiful verdure, and giving the promiſe of a plentiful harveſt. Nature at firſt, indeed, works in ſecret, while the ſeed is opening; but its operations may be diſcovered, by taking ſome of the grains out of the ground when they are beginning to ſhoot. Two days after the grain is put into the earth, it is ſwelled by the juices, and begins to ſhoot. The ſhoot is always at one of the ends of the grain; and that part of it which is next the outſide of the grain is the little root of the future plant. The part turned inwards is the ſtalk and head of the plant. The corn, when ſowed, generally begins in twenty-four hours to pierce through the coat, and unfold itſelf. The root and ſtalk become viſible. The root is firſt wrapped up in a bag, which it burſts open. Some daays after, other roots ſhoot out of their ſides. The fifth or ſixth day, a green ſtalk ſprings up above the ground. It remains ſome time in that ſtate, till the fine ſeaſon comes, when the ear of corn breaks out of the coats, in which it had been encloſed, and protected from cold and uncertain weather.

All this naturally leads us to reflect on the nature of human life. Our preſent exiſtence is but the ſeed from whence everlaſting life is to ſpring. We are here in the ſowing ſeaſon, and we ſee but little as yet ſprung forth. We cannot here behold

the fruit in maturity, or the corn in perfection. The harveſt will not be reaped on earth. We live in hope. The farmer has ſowed his field. He leaves his grain to corruption, to the rain, the ſtorms, and the heat of the ſun; and he ſees not what will be the reſult. This is preciſely our ſituation in regard to ſpiritual ſeed. Let us not be vain of what we ſow, neither let us be diſcouraged, if we do not reap the fruits of it. Let us not be weary of "ſowing to the Spirit;" and perhaps our good works, however trifling in themſelves, may have happy conſequences hereafter. Now that our ground is ſowed, let us wait patiently, and without anxiety, till we reap the fruits of our labour; and, like the pious farmer, let us pray to God to ſhed his bleſſings on our fields!

LESSON CXXXIII. FORTY-FIFTH WEEK.

THE MEASURE AND DIVISION OF TIME.

TIME is meaſured and divided according to the motions of the celeſtial bodies, and particularly by thoſe of the ſun and moon. Thoſe two globes have the moſt influence on the ſtate of mankind. The courſe of the moon only ſerves to meaſure the time on our earth; that of the ſun certainly regulates the time in all the planets which move round it. Day is the ſpace of time in which the ſun makes a revolution round the earth; or, to ſpeak more juſtly, it is the time our earth takes in turning round its own axis. The part of this time during which the ſun is above the horizon, we call artificial day. This is when the light is determined by ſun-ſet and ſun-riſe. The time of darkneſs, or when the ſun is below the horizon,

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we call night. The day and night together make the ſolar day. We divide it into 24 parts, called hours; each hour is divided into 60 equal parts, called minutes; each minute into 60 ſeconds; and each ſecond into 60 thirds. This diviſion of the day into hours, minutes, &c. is marked by the motion of the ſhadow on a ſun-dial, or by the hand of a clock. A good ſun-dial conſtantly marks the hour truly, but clocks or watches require to be often regulated. Moſt Europeans, in common life, begin their hours of the day at noon, from whence they reckon twelve to midnight, and twelve more to noon again. The Italians begin the day at ſun-ſet, and reckon twenty-four hours from thence to the following evening. The Turks begin their day at a quarter of an hour after ſun-ſet; they reckon from thence twelve equal hours, and, when thoſe are paſſed, they reckon twelve more to the following evening. The Jews begin the day at ſun-ſet; from thence they reckon twelve equal hours to ſun-riſe, and as many to ſun-ſet; conſequently, their hours of day are longer or ſhorter than thoſe of night, in proportion to the length of the day and night. A week is the ſpace of ſeven days. A ſolar month is the time the ſun takes in traverſing a ſign of the Zodiac: but thoſe months do not begin or end exactly as that body enters a new ſign. The lunar month is the ſpace of time between two new moons, that is to ſay, twenty-nine days, twelve hours, and forty-four minutes. The ſolar year takes in twelve ſolar months, which is the time the ſun takes in traverſing the twelve ſigns of the Zodiac; and there are generally reckoned in that time, three hundred and ſixty-five days, five hours and forty minutes. Theſe are now the years in moſt parts of Europe. The lunar year takes in twelve lunar months, or twelve courſes of the moon round the earth. It is compoſed of three

hundred and fifty-four days, eight hours, and forty-eight minutes. The Jews and Turks make use of this reckoning; but in order to make it answer to the solar year, they often add a whole month to it. Our common year begins ten or twelve days after the sun has entered Capricorn.

This measure or division of time, however unimportant it may appear in itself, may become of much consequence, by the application of it to the moral life of man. The hours, days, weeks, months, and years, of which our earthly life is composed, were given us in order that we should fulfil the design of our existence, by making a good use of our faculties. But how do we employ this precious time! Minutes appear to us too trifling to attend to. It is certain, however, that he who does not reckon minutes will lavish hours also.

"Teach us, O Lord, so to number our days, "that we may apply our hearts unto wisdom."

LESSON CXXXIV.

THE END OF SUMMER.

THE sun is now taking leave of our world. Every thing is changed with us. The earth, which was lately so beautiful and fruitful, is now becoming gradually barren and poor. We no longer behold that fine enamel of the trees in blossom, the charms of spring, the magnificence of summer, those different tints and shades of verdure in the woods and meads, the purple grapes, nor the yellow harvests which crowned our fields. When the earth is stripped of its corn, its grass, and its leaves, nothing is to be seen but a rough and rugged surface. It has no longer that beautiful appearance which the corn, greens, and herbs, produce

produce over a vaſt country. The birds no longer ſing; nothing now recalls to the mind of man that univerſal joy which reigned throughout all animated nature. Deprived of the pleaſure which the melodious ſongs of the birds afforded, he hears little now but the murmuring ſtreams and whiſtling winds, conſtantly the ſame dull ſounds; a muſty ſmell of plants and leaves decaying, and a cold damp air, are diſagreeable to the feeling. But in the midſt of theſe melancholy proſpects, let us ſtill obſerve, that nature faithfully fulfils the eternal law preſcribed to her, of being uſeful at all times and ſeaſons of the year. Winter draws nigh; the flowers are going; and even when the ſun ſhines, the earth no longer appears with its uſual beauty. Yet the country, ſtripped and deſert as it is, ſtill preſents to a feeling mind the image of happineſs. We may recollect with gratitude to Heaven, that the fields which are now barren were once covered with corn and plentiful harveſt. It is true, that the orchards and gardens are now ſtripped, but the remembrance of what they beſtowed upon us may make us content to bear the northern blaſts which at preſent we feel ſo ſharp. The leaves are fallen from the fruit-trees; the graſs of the field is withered; dark clouds fill the ſky, and fall in heavy rains. The unthinking man complains at this; but the wiſe man beholds the earth moiſtened with rain; and beholds it with a ſweet ſatisfaction. The dried leaves and the faded graſs are prepared, by the autumal rains, to form manure to enrich the ground. This reflection, with the pleaſing expectation of ſpring, muſt naturally excite our gratitude for the tender mercies of our Creator.

LESSON CXXXV.

THE WANTS OF MAN.

THERE is not a creature on earth that has ſo many wants as man. We come into the world naked, ignorant, and deſtitute. Nature has not endowed us with that induſtry, and thoſe inſtincts, which the beaſts have at their birth. Reaſon has been beſtowed on us, that we ſhould acquire the neceſſary knowledge and talents. They bring with them at their birth, clothes, arms, and all they want, or they have thoſe natural inſtincts, which, by following blindly, procure it for them. If they require habitations, they know how to dig or build them; if they want beds, covering, or change of clothes, they know how to ſpin and weave them, and get rid of their old ones; if they have enemies, they are provided with arms to defend themſelves; if they are ſick or wounded, they know where to find proper remedies. And we, who are ſo ſuperior to other animals, have more wants, and fewer means of ſupplying them, than they have. By not having their inſtinct to aſſiſt our many bodily wants, we are obliged to make uſe of our reaſon, in order to acquire a knowledge of the world, and of ourſelves. It is neceſſary to be active, vigilant, and laborious, to preſerve us from poverty, pain, and vexation, and in order to make our lives pleaſant and happy. Reaſon is, at the ſame time, the only means to ſubdue our ſtrong paſſions, and to prevent us from running into exceſſes of pleaſure, which might be fatal to us. A few examples may convince us of this. If we could obtain, without any trouble, all our food, &c. we ſhould certainly become indolent and idle, and we ſhould paſs our lives

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in ſhameful ſloth. The nobleſt faculties of man would weaken and grow dull. The bonds of ſociety would be broken, becauſe we ſhould no longer depend on one another. Even children would be able to do without the aſſiſtance of their parents, and ſtill leſs would they want it from others. All human kind would fall again into a ſtate of barbarity. Wild and ſavage, every one would live, like the brutes, for themſelves only. There would be no ſubordination, no mutual obligations or good offices. It is, then, to our wants that we owe the opening of our faculties, and the prerogatives of humanity. They awaken the mind, create activity and induſtry, and make our lives more eaſy and pleaſant than thoſe of other animals. Our wants have made us ſociable, rational, and regular in our manners; they have given riſe to a multitude of uſeful arts and ſciences. In general, an active and laborious life is beneficial and neceſſary to man. If his faculties and powers are not exerciſed, he becomes a load to himſelf, he falls gradually into a ſtupid ignorance, into groſs exceſſes, and all the vices reſulting from them. Labour, on the contrary, ſets all the machine into a pleaſing motion, and gives ſo much the more ſatisfaction and enjoyment, as it requires the more induſtry, reflection, underſtanding, and knowledge. If, after having been fed with our mother's milk, we required no aſſiſtance or inſtruction, we ſhould only live for ourſelves, we ſhould centre all in ſelf; learning no language, we ſhould make no uſe of our reaſon; ſtupid and profoundly ignorant, we ſhould neither be acquainted with the arts nor ſciences, nor the nobleſt pleaſures of the ſoul: whereas, now, the wants of children, the deſtitute ſtate in which they come into the world, oblige the parents through pity and tenderneſs, to take care of them; whilſt the children, on their parts,

are attached to their parents, by a ſenſe of their own helpleſs ſtate and danger, and ſubmit to be guided and formed by their inſtruction and example, how to make a proper uſe of their reaſon, and to reſpect morality. Thus they may become worthy men, good citizens, and lead a virtuous and happy life. With ſuch advantages, we may eaſily give up thoſe which the animals appear to have over us. We require neither furs nor feathers to clothe us, no teeth or claws to defend us, neither more cunning or natural inſtinct to procure us neceſſaries. We find, then, that theſe wants, of which ſo many complain, are the true foundations of our happineſs, and the beſt means which Divine Wiſdom and Goodneſs could make uſe of, in order to direct the faculties of man to the greateſt advantage.

LESSON CXXXVI. FORTY-SIXTH WEEK.

FOREIGN ANIMALS.

EVERY part of the world has animals of its own, and it is for very wiſe purpoſes that the Creator has placed them in one country, rather than in another. The moſt remarkable animals in the ſouthern countries are the elephant and camel. They ſurpaſs all the quadrupeds in ſize. The elephant in particular appears like a moving mountain, and its bones are like pillars. Its head is joined to a very ſhort neck, and armed with two tuſks ſtrong enough to tear up trees, or throw them down. A longer neck could not ſupport the weight of the head, nor hold it up. But to make amends for the ſhort neck, his trunk is very long. He uſes it as a hand to convey food to his mouth, without

without being obliged to ſtoop for it. He not only moves, bends, and turns it always, to do whatever we do with our fingers, but he makes uſe of it as an organ of ſmell; his eyes are ſmall in proportion to the ſize of his body, but they are bright and full of fire. All his inward feelings are expreſſed in them. In a ſtate of independence, before the elephant is tamed, it is neither ſanguinary nor fierce. It is of a mild nature, and never makes uſe of its weapons but in its own defence. It never hurts any body unprovoked, but it becomes terrible when irritated. It ſeizes its enemy with its trunk; flings it like a ſtone at him, and then treads him to death. The elephant eats above 100 pounds of graſs a-day; but its body being of an enormous weight, it cruſhes and deſtroys with its feet ten times more than it conſumes in food. Its chief enemy, and often its conqueror, is the rhinoceros, an animal very like the wild boar, that makes uſe of the horn which grows upon his noſe to pierce the belly of the elephant. It requires very little attention to perceive the wiſdom of God in the production of the elephant. He has ordained that it ſhould be born in countries abounding with graſs, and that it ſhould not become a burden to the earth by multiplying too faſt. The camel is one of the moſt uſeful animals in the eaſt; it is admirably adapted to bear the greateſt fatigues in the midſt of barren deſerts and burning ſands; being able ſometimes to live four or five days without drink, and requiring but very little food in proportion to its ſize. It browſes the few plants and ſhrubs that grow in the deſerts; and when he finds none, two meaſures of beans and barley ſerve for a whole day's ſubſiſtence. Beſides the hump which grows on its back, there is ſtill another ſingularity in its make: this is a double throat, one of which reaches to the ſtomach, and the

the other terminates in a bag which ſerves him as a reſervoir to keep water in. It remains there without corrupting; and when the animal is preſſed by thirſt, and has occaſion to dilute its dry food, it draws up into its paunch part of this water, which moiſtens the throat, and goes afterwards into the ſtomach. The common load a camel bears is from 700 to 800 pounds weight; and with this burden they go two German leagues and an half in an hour; and they generally travel twelve or fifteen hours a-day. The fleſhy foot of the camel is made to walk on ſand, while the horny hoof of the horſe would be hurt or burnt by it.

The moſt remarkable quadrupeds in the northerns countries are the elk, the ſable, and the rein-deer. The firſt of theſe animals is large, ſtrong, and finely ſhaped. Its head ſomething reſembles the mule in form, ſize, and colour; its legs are long and ſtrong; its hair of a light grey. This animal is ſimple, ſtupid, and timorous. It finds food every where; but it prefers bark, or the tender ſhoots of the willow, the birch, or the ſervice-tree. It is extremely ſwift, and having long legs, goes a great way in a very ſhort time. The ſable wanders in the foreſts of Siberia, and is much ſought on account of its beautiful fur. The hunting of this animal is generally the ſad occupation of the wretches who are baniſhed to thoſe deſerts. The rein-deer is an animal of a moſt elegant pleaſing form, very like a ſtag. It ſeeks its own food, which conſiſts of moſs, graſs, leaves, and buds or ſhoots of trees. The northern nations draw many uſes from them. They eat their fleſh, drink their milk, and are drawn by them in ſledges, with extreme ſwiftneſs, upon the ice and ſnow. All the wealth of the Laplanders conſiſts in their rein-deer. The ſkin furniſhes them with

with clothes, beds, and tents; in a word, with all the neceſſaries of life.

What has been ſaid of theſe foreign beaſts may give riſe to important reflections. How prodigious the diſtance between the elephant and the mite! In many parts of the world there are animals which could not bear the climate, air, food, or degree of heat, they would find in Europe; neither can it be doubted but there are millions of animals which could not exiſt on our globe, and could no more live amongſt us, than we could live in the planet of Saturn, or that of Mercury.

LESSON CXXXVII.

VARIETY OF WINDS.

THERE are great variety of winds. In ſome places they are fixed the whole year, and blow always from the ſame point. In others, they change at certain periods of time, but ſtill by fixed and regular laws. At ſea between the tropics, and ſome degrees below them, there is a wind which laſts the whole year without any conſiderable variation. On the north of the line, the wind blows towards the north-eaſt; and on the ſouth of the line, it blows towards the ſouth-eaſt, more or leſs, according to the poſition of the ſun. This muſt be underſtood to mean the wind at open ſea; for, if iſlands or great continents are oppoſed to it, the direction may be changed to north-eaſt. In the ſouthern parts of the ocean, the wind is generally weſterly. The nearer to the coaſt, the more changeable is the wind, and ſtill more ſo on land. The conſtant eaſt wind is chiefly owing to the heat which the ſun communicates to our atmoſphere. In the Indian ſeas there are winds called trade-

winds

winds or monſoons, which blow for three or ſix months of the year from one point, and for the ſame ſpace of time from the contrary point. Theſe winds have not yet been well accounted for; but certainly we muſt look for the cauſes of them in the changes from heat to cold, the poſition of the ſun, the nature of the ſoil, meteors taking fire, vapours diſſolving into rain, and other ſuch circumſtances. There are ſeas and countries which have winds and calms peculiar to them. In Egypt and in the Perſian Gulph, there is, during ſummer, a burning wind, which ſuffocates and conſumes every thing. At the Cape of Good Hope, there forms a cloud ſometimes which is called the fatal wind, or the ox-eye: it is at firſt very ſmall, but viſibly increaſes, and ſoon produces a furious tempeſt, which ſwallows up ſhips, and plunges them into the deep. Variable winds, which have no fixed direction or duration, blow over the greateſt part of the globe. It is true, that ſome certain winds may blow more frequently in one place than in another; but it is not at any regular time that they either begin or end. They vary in proportion to the ſeveral cauſes which interrupt the equilibrium of the air: heat, cold, rain, fair weather, mountains, and even the ſtraits, capes, and promontories, may contribute very much to interrupt their courſe, or change their direction. There are many other cauſes, certainly, though not yet known to us, for the different modifications and turns of the wind. One thing particularly remarkable is, what happens every day, and almoſt in every place, a little before ſun-riſe: when the air is perfectly calm and ſerene, at the dawn of day, there comes a quick eaſterly breeze, at the approach of the ſun, which continues ſome time after it riſes, The cauſe of this muſt be, that the air being heated by the riſing ſun, rarefies, and by its dilating, ſends the contiguous air towards the weſt; this neceſſarily

ceſſarily produces an eaſt wind, which we ceaſe afterwards to feel as the air grows warmer. From the ſame cauſe, the eaſterly wind muſt not only precede the ſun always in the torrid zone, but be much ſtronger alſo than in our countries, becauſe the ſun acts more moderately upon us than it does near the line. In the torrid zone, the wind blows conſtantly from eaſt to weſt. A weſterly wind is very rarely felt there.

We may obſerve, then, that the winds are not the effect of chance, to which no cauſe can be aſſigned. In this, as in every thing elſe, the Creator ſhews his wiſdom and goodneſs. He has ſo ordained, that the winds ſhould riſe from time to time, and that there ſhould be but very ſeldom an abſolute calm. He regulates the motion, force, and duration of the winds, and preſcribes the direction in which they are to blow. Even their being variable is a benefit to us. When a long drought cauſes animals and plants to grow faint and languid, a ſea-wind ſends clouds loaded with vapours, to moiſten the ground, and revive all nature. When this is done there comes a dry eaſterly wind, to reſtore the ſerenity of the air, and to give us fine weather. The north-wind clears away a great quantity of icy particles, and carries off the noxious vapours of autumn.—To the ſharp north wind, ſucceeds the ſoutherly wind, which fills the air with an enlivening warmth; and to theſe continual changes of the wind we owe our health, and the fertility of the earth. Who can make theſe reflections without adoring God? All the elements are at his command: at his word the ſtorms and tempeſts roar; they ruſh from ſea to ſea, from land to land; and at his command all is calm again. Should we not, therefore, put our whole truſt in him? He who directs the winds as he pleaſes, will he not guide our ways? Whilſt at his command all the changes of the wind combine

bine for the good of his creatures, may we not believe that the viciſſitudes of life contribute to the real happineſs of each individual.

LESSON CXXXVIII.

HUNTING.

HUNTING is one of the chief amuſements of a certain order of people at this ſeaſon; but it is to be wiſhed they did not ſet ſuch value upon it; for the power man has over animals, and the pleaſure he takes in ſubduing them, is too often mingled with cruelty. Sometimes, it is true, there is a neceſſity that animals ſhould be put to death, in order to make the uſe of them for which they were deſigned, or to prevent an increaſe that would be hurtful to us: but even then their death ought to be made as eaſy as poſſible; and unfortunately this law preſcribed by Nature is little attended to by ſportſmen. Men, in this reſpect, ſhew themſelves more cruel tyrants than the fierceſt beaſt. Is not the way of hunting a hare or ſtag dreadful to every feeling heart? Can it be an innocent pleaſure to purſue with rage and fury a poor animal, which flies from us in violent anguiſh, till at laſt, exhauſted with terror and fatigue, it falls and expires in horrid convulſions? Is it humanity not to be affected with ſuch a ſight, nor to feel compaſſion at it? To purchaſe a pleaſure by the death of an innocent creature, is purchaſing it too dearly. It is a dangerous pleaſure, if it makes barbarity familiar to us. It is impoſſible, that the heart of a man, paſſionately fond of hunting, ſhould not inſenſibly loſe the ſweet feelings of humanity. Such a man ſoon becomes cruel and barbarous; he finds pleaſure in none but ſcenes of horror and deſtruction; and, having

having accuſtomed himſelf to be inſenſible towards animals, he ſoon becomes ſo towards his fellow-creatures. Hunting does not appear to me in general an occupation which we can reconcile with the duties we are called upon to fulfil. Without mentioning the loſs of time, a loſs in itſelf of conſeſequence, it is certain that hunting diſſipates too much, and fills the mind with ideas incompatible with ſerious employments. Gentler amuſements are more proper to unbend and divert the mind, than thoſe tumultuous pleaſures which do not leave us the uſe of reflection. Hunting muſt ever appear a dangerous employment to a moral and religious man; for ought we not to be afraid of a pleaſure which leads to ſins and irregularities? How does the health ſuffer by ſuch a violent exerciſe, and the ſudden tranſitions from heat to cold! What exceſſes, what ſwearing, what cruelties are allowed! How are the horſes, dogs, and even the men treated! What miſchief done to the meadows and fields! Can all theſe be called trifles not worth attending to? If we were wiſe, we ſhould ſeek pleaſures more innocent and pure, and we ſhould certainly find them. Why then ſhould we run after groſs pleaſures, which always leave remorſe and diſguſt behind them? We have within ourſelves an abundant ſource of enjoyments. A number of intellectual and moral faculties, the culture of which may afford the greateſt ſatisfaction. But it is in this that the great knowledge of a Chriſtian philoſopher conſiſts —he has the art of being happy without much preparation or trouble, and particularly without being ſo at the expence of his virtue.

LESSON

LESSON CXXXIX. FORTY-SEVENTH WEEK.

EVERY THING COMBINES FOR THE PRESERVATION OF THE CREATURES IN THE WORLD.

EVERY thing which the beneficent Creator has produced upon our globe is admirably connected with one another, ſo as to contribute to their mutual preſervation. The earth itſelf, with its rocks, minerals, and foſſils, owe their origin and continuance to the elements. The trees, plants, herbs, graſs, moſs, in a word, all the vegetables, draw their ſubſiſtence from the earth, whilſt the animals, in their turn, feed upon the vegetables. The earth gives nouriſhment to the plant, the plant is food for the inſect, the inſect for the bird, the bird for wild beaſts; and, in their turn, the wild beaſts become the prey of the vulture, the vulture of the inſect, the inſect of the plant, and the plant of the earth. Even man, who turns all theſe things to his own uſe, becomes himſelf their prey. Such is the circle in which all things here take their courſe. Thus, all beings were created for one another. Nothing was created merely for itſelf. Tygers, lynxes, bears, ermines, foxes, and other animals, provide us with furs to cover us: dogs purſue the ſtag and the hare, to furniſh our tables; their ſhare of the prey is very ſmall: the terrier drives the rabbit from its deepeſt receſſes into our ſnares: the horſe, the elephant, and the camel, are trained to carry burdens, and the ox to draw the plough: the cow gives us milk: the ſheep its wool: the reindeer make the ſledges fly over ſnow and ice: the ſwine and the porcupine rake into the earth, and the moles ſtir it up, that the ſeed of plants and herbs,

herbs, being diſperſed, may the more eaſily propagate: the hawk ſerves us in fowling, and the hen gives us eggs: the cock wakes us early in the morn, and the lark amuſes us with its ſong in the day-time: the whiſtling note of the blackbird is heard from morn to evening, and the melodious warbling of the nightingale charms us in the night: the ſtately plumage of the peacock gives pleaſure to the ſight: the very fiſh come from the depths of the ocean, venture upon the coaſt, and go up rivers, in order to furniſh plenty of proviſion for men, birds, and wild beaſts: the ſilk-worm ſpins its precious web to clothe us: the bees collect with care the honey we find ſo delicious: the ſea continually throws upon its ſhores multitudes of craw-fiſh, lobſters, oyſters, and all ſorts of ſhell-fiſh for our uſe: the jack-a-lantern, or great fly of Surinam, ſhines in the midſt of darkneſs, to give light to the inhabitants of thoſe countries. If we obſerve the different occupations of mankind, we ſhall find that they alſo tend to this ſame end which nature purpoſed. The ſailor braves the dangers of ſeas and ſtorms, to convey merchandizes which do not belong to him, to their deſtined place: the ploughman ſows and reaps grain, which he conſumes but little of himſelf. Thus, we do not live for ourſelves only; for the wiſe Author of nature has ſo ordained, that all beings ſhould become uſeful to one another. Let us learn from thence our mutual duties. The ſtrong ſhould aſſiſt the weak; the informed man ſhould aſſiſt with his advice thoſe who want it; the learned ſhould inſtruct the ignorant: in a word, we ſhould love our neighbour as ourſelves, and thus fulfil the deſigns of the Creator. The mutual offices men owe to one another have made them form into ſocieties. What divided force could not accompliſh, is eaſily performed by united ſtrength. No body could erect a fine building or palace

palace without aſſiſtance: one perſon alone could not lay the foundation, dig the cellars, make and burn the bricks, raiſe the walls, put on the roof, make the windows, decorate the apartments, &c. but all this is done with eaſe when the different workmen aſſiſt one another. Even the things which appear to us of ſo little importance, that we ſcarce deign to look at them, they all contribute to make us happy. The very inſects we ſo much deſpiſe are uſeful to us. May it teach us to value as we ought the goodneſs of our merciful Father, and to be ſenſible of our own happineſs!

LESSON CXL.

COMMON SALT.

THE ſeaſoning moſt in uſe, and that which the rich or poor, the king or the beggar can leaſt diſpenſe with, is the common ſalt. Its flavour is ſo pleaſing, and it has ſuch excellent properties for digeſtion, that it may be conſidered as one of the moſt valuable gifts which nature has beſtowed upon us. It is given to us in different ways: thoſe who live near the ſea receive it from thence; they dig marſhes on the ſea-ſhore, which are called ſalt-marſhes, and plaſter them with clay: the ſea flows into them when it is rough, and the waves high. The water that remains in the marſhes ſoon evaporates with the heat of the ſun, and the ſalt is left at bottom in great abundance. Nature alſo produces ſalt ſprings, fountains, and lakes. In order to extract the ſalt out of them, the water is boiled in great caldrons. In other places the ſalt is found in ſolid maſſes in the mountains. The moſt famous mines are thoſe of Catalonia and Poland. Theſe different kinds of ſalt are all alike as

to

to their chief properties. Experience has taught us, that ſalt diſſolves in the ſtomach and bowels; that it has a power of digeſtion, prevents putrefaction, and too great a fermentation of our food. For this reaſon it is taken inwardly to promote digeſtion, to rectify crudities in the ſtomach, loſs of appetite, and coſtiveneſs. It not only diſſolves the phlegm, which takes away the appetite, and prevents digeſtion, but it is alſo a good ſtimulus for the ſtomach, the nerves of which it gently irritates, and promotes all its operations. Moſt of our food would be inſipid and taſteleſs without ſalt; yet this is the leaſt of its advantages, when we conſider the great uſe it is of to us in reſpect to health. Another circumſtance in regard to ſalt will appear intereſting to every obſerver of the works of nature: the ſmalleſt grain of common ſalt ſeems cut into eight angles, or with ſix ſides, like a die; from whence moſt maſſes of this ſort of ſalt muſt be of a ſquare or cubical form. In this again the Divine Hand is viſible, which has given to ſalt an invariable form, that has been ſuch from the beginning of the world. This form, conſtantly the ſame, and ſo exact, is a very ſtriking proof that it does not owe its original to a blind chance, but to the will of an intelligent Being. This thought is too important and too neceſſary to our peace, not to make uſe of every occaſion to recollect, and impreſs it more and more upon our minds.

LESSON CXLI.

ORIGIN OF FOUNTAINS AND SPRINGS.

ALL the great rivers are formed by the union of leſſer rivers, and thoſe owe their riſe to the rivulets which run into them, and the rivulets to the

the ſprings and fountains: there can be no doubt of this. But from whence do the ſprings come? Water, from its height and fluidity, always fills the loweſt parts of the ſurface of the earth: from whence then can the water come, which flows ſo conſtantly from the higheſt regions?—In the firſt place, it is certain, that the rain, the ſnow, and, in general, all the vapours which fall from the air, furniſh a great part of the water which flows from ſprings; conſequently, rivers and ſprings are very rare in the deſerts of Arabia, or in parts of Africa where it never rains. Theſe waters penetrate down into the earth, till they find beds of white clay, which they cannot get through: there they accumulate and become fountains, or they collect in cavities, which afterwards overflow, and the water gradually gets through crevices, great and ſmall, falling towards the bottom, to which its weight naturally inclines it. Thus the water continually flows, and makes itſelf ſubterraneous currents, with which other currents mix, and by their union form what is called a vein of water. It is, however, very probable, that, in ſome countries at leaſt, the ſprings do not owe their origin entirely to the waters which fall from the atmoſphere; for there are on ſeveral high mountains conſiderable ſprings and lakes, which do not ſeem as if they could be produced entirely by ſnow or rain. There are many ſprings which give an equal quantity of water at all ſeaſons, and even more ſometimes in the hotteſt and drieſt weather than when damp and rainy. There muſt, of courſe, be other cauſes both for the riſe and ſupply of ſprings. Many of them are produced by vapours which are carried up into the atmoſphere, and driven by the wind towards the mountains, or, by the power of univerſal attraction, are drawn towards thoſe great maſſes. The atmoſphere is more or leſs full of watery vapours, which being

being driven and preſſed againſt hard and cold rocks, condenſe immediately into drops, and thus ſwell the ſprings.

However, we muſt ſtill allow that all the ſprings cannot be owing to this cauſe: for muſt not the Danube, the Rhine, and other great rivers which come from high mountains, dry up when theſe enormous maſſes in winter are covered with ſnow and ice. Certainly there muſt be caverns, which, by a communication with the ſea or lakes, contribute to form ſprings. The ſea-water, having gone through ſubterraneous channels into theſe great cavities, it riſes in vapour through a number of crevices, and forms into drops, which, falling again with their own weight, take ſometimes quite another courſe, becauſe water cannot always penetrate where the vapours do. All the cauſes here pointed out contribute more or leſs to the forming of ſprings; and there may be other cauſes unknown to us. It is true that nature is always ſimple in its operations; but this ſimplicity does not conſiſt in making uſe of one cauſe only for each particular effect: it conſiſts in making uſe of as few as poſſible, which does not prevent there being always ſeveral auxiliary cauſes which concur in working the effect which nature propoſes.

LESSON CXLII. FORTY-EIGHTH WEEK.

SYSTEM OF THE UNIVERSE.

HITHERTO we have only been conſidering the earth, this globe, which is but a ſpeck in compariſon of the immenſe univerſe. Let us now raiſe our thoughts to thoſe innumerable worlds, at the ſight of which, this ſpot that we and millions of

other creatures inhabit, will appear as nothing. Let us examine, reflect, and adore. The ſun, which gives life to every thing, is almoſt in the centre of the ſyſtem; and, without changing place, it turns round its own axis, from eaſt to weſt, in twenty-ſeven days and twelve hours. All the planets, from Mercury to Saturn, move round the ſun in an oblong orbit or ellipſis. Mercury, which of all the globes is neareſt to the ſun, performs its revolution in near eighty-eight days, but at ſo ſmall a diſtance from the ſun, that it is generally concealed in its rays, ſo as to be inviſible to us. Venus deſcribes a larger ellipſis, and finiſhes her courſe in little more than 224 days. The earth requires a year to perform its revolution; and in this annual journey it is attended by the moon. Mars finiſhes his courſe in 687 days; Jupiter, with his four moons, in twelve years, or thereabouts; Saturn moves with his five ſatellites, round the ſolar circle, in the ſpace of thirty years. And laſtly, the Georgium Sidus, with his two ſatellitees (already diſcovered, and it is probable he has many more) which, of all the planets known to us, is furtheſt from the ſun, in about eight-two years But is it poſſible that the ſun, which we daily behold traverſing the ſky in twelve hours, ſhould remain fixed in the centre of the world? Do we not in the morning ſee it in the eaſt, and in the evening in the weſt? Could the earth move round the ſun without our perceiving it? This objection, founded on the illuſion of our ſenſes, is of no weight. Do we perceive the motion of a boat, in ſailing upon the river? and, when we are in a boat or carriage, does it not ſeem as if every thing round us moved, and as if all the objects went back out of their place, though in reality they never move? However our ſenſes may be deceived in this reſpect, our reaſon forces us to acknowledge the truth and wiſdom of the

the ſyſtem which ſupports the motion of the earth. Nature always acts in the ſhorteſt, eaſieſt, and ſimpleſt ways. By the ſingle revolution of the earth round the ſun, we can account for the different appearances of the planets, their periodical motions, their ſituations, their direct and their retrograde motions. And is it not much more natural and eaſy, that the earth ſhould turn round its axis in twenty-four hours, than that ſuch great bodies as the ſun and planets ſhould move round the earth in that ſpace of time? One undeniable proof of the ſun, and not the earth, being in the centre of the world, is, that the motions and diſtances of the planets depend upon the ſun, and not upon the earth.

Theſe reflections on the ſyſtem of the univerſe are calculated to give us the higheſt idea of our adorable Creator, and to make us ſenſible of our own inſignificance.

LESSON CXLIII.

GREATNESS OF GOD EVEN IN THE SMALLEST THINGS.

WHOEVER loves to contemplate the works of God, will trace him not only in thoſe immenſe globes which compoſe the ſyſtem of the univerſe, but alſo in the little worlds of inſects, plants, and metals. He will acknowledge and adore Divine Wiſdom as much in the ſpider's web as in the power of gravitation which attracts the earth towards the ſun. Theſe reſearches are now the eaſier, as the uſe of microſcopes diſcover to us new ſcenes, and new worlds, in which we behold, in miniature, all that can excite our admiration. Let us, in the firſt place, obſerve the moſſes, and

the grafs which are produced in fuch abundance. Of how many fine threads and little particles are thofe plants compofed! What variety in their forms and fhapes! Who could count all their forts and kinds! Think of the multitude of little parts which any one is compofed of, and into which it may be divided. If an hexagon, of the fize of an inch, contains fome millions of vifible particles, who could calculate the parts of which a mountain muft be compofed? If thoufands of particles of water may be fufpended on the point of a needle, how many muft there be in a fountain! how many in the rivers and feas! If a grain of fand contains feveral thoufands of particles of air, how many muft there be in the human body! If we pafs next to the animated creation, the fcene will in a manner extend to infinity. In the fummer-time the air fwarms with living creatures. Each drop of water is a little world inhabited. Each leaf of a tree is a colony of infects. Every one muft have feen the innumerable fwarms of flies, gnats, and other infects, which collect together in a very fmall fpace; what prodigious fhoals muft there be in proportion over the whole earth, and in the immenfe expanfe of the atmofphere! Does not the power of the Creator ftrike us with aftonifhment, when we reflect on the multitude of parts of which thefe little creatures are compofed, whofe exiftence is fcarce known? If we could not at any time prove it by experiments, fhould we imagine that there were animals a thoufand times lefs than a grain of fand, with organs of nutrition, motion, &c. There are fhell-fifh fo fmall, that even through a microfcope they fcarce appear fo large as a grain of barley; and yet they are living animals, with very hard houfes, in which there are different apartments. How extremely fmall is a mite, and yet this almoft imperceptible atom, when feen through a micro-

fcope,

ſcope, is a hairy animal, perfect in all its limbs, of a regular form, full of life and ſenſibility, and provided with all the neceſſary organs. Although this animal is ſcarce viſible to us, it has many parts ſtill ſmaller. One circumſtance particularly admirable is, that the glaſſes which diſcover ſo many defects in the beſt finiſhed works of man, ſhew us nothing in theſe microſcopic objects but regularity and perfection. How inconceivably fine and tenuous are the ſpider's threads! It has been calculated, that 36,000 of them would only make the thickneſs of common ſewing ſilk. How muſt this ſtrike the mind with aſtoniſhment! But could we magnify a mite to appear as large as a grain of barley, what wonders might we not then diſcover? Even then we ſhould not be able to ſee to the end. It would be preſumptuous and extravagant to ſuppoſe it. Each creature has a kind of infinity, and the more we contemplate the works of God, the more will the miracles of his power multiply in our ſight.

LESSON CXLIV.

REFLECTIONS ON SNOW.

DURING winter the ground is often covered with ſnow: every body ſees it fall, but very few take the trouble to inquire into its nature and uſe. Such is our inattention to moſt objects which we have daily before us, that thoſe things moſt worth attending to are often what we leaſt value. Let us learn to be wiſer, and let us employ ſome moments in reflecting upon ſnow. It is formed of very light vapours, which congeal in the atmoſphere, and fall again in flakes more or leſs thick. In our climates the ſnow is pretty large; but travellers aſſert, that in Lapland it is ſometimes ſo ſmall that

it is like a fine dry duſt. This certainly proceeds from the great cold of thoſe countries. We obſerve, that the flakes are larger with us in proportion as the cold is more moderate, and they become ſmaller when it freezes hard. The little flakes of ſnow are generally like hexagon ſtars; but there are ſome of eight angles, others of ten, and ſome alſo of an irregular ſhape. The beſt way of examining them is to receive the ſnow on white paper. But there has not hitherto been any ſatisfactory cauſe given for the variety of forms. As to the whiteneſs of this meteor it is not difficult to explain, Snow is extremely thin and light, conſequently it has a great many parts, which are certainly full of air. It is beſides compoſed of parts more or leſs cloſe and compact: ſuch a ſubſtance does not admit the rays of the ſun or abſorb them; on the contrary, it reflects them very ſtrongly, which makes it appear white to us. Snow newly fallen is twenty-four times lighter than water. If twenty-four meaſures of ſnow are melted, they produce but one of water. Snow is not frozen water, but only frozen vapours. It evaporates conſiderably, which the moſt intenſe cold cannot prevent. It has been doubted whether it ſnowed at ſea; but thoſe who have gone voyages in the winter on the northern ſeas aſſured us they have had a great deal of ſnow there. It is known that the high mountains are never entirely free from ſnow. The air being much warmer in the plains than on heights, it may rain with us while it ſnows heavily on high mountains. Snow is of uſe in ſeveral ways. As the winter cold is much more hurtful to vegetables than to animals, the plants would periſh if they were not preſerved by ſome covering; therefore it is wiſely ordered, that the rain, which in ſummer cools and revives the plants, ſhould in winter fall in the form of ſoft wool, to cover the vegetables, and to guard them from

from the inclemency of froſt and winds. The ſnow has a degree of warmth in it; but not too much, ſo as to choak the grain. As, like all other vapours, it contains different ſalts, which it leaves in the ground when it melts, this much enriches the earth. The melted ſnow not only moiſtens the earth, but waſhes every thing hurtful away from the winter ſeeds and plants. What remains of the ſnow-water helps to fill up the ſprings and rivers which had diminiſhed during the winter.

Theſe reflections may convince us, that winter has its advantages, and is not ſo melancholy a ſeaſon as many imagine. Let us look up with joy and gratitude towards that beneficent Being who cauſes bleſſings to flow even from the clouds of ſnow upon the earth. How unpardonable to murmur, when it is our own faults if we do not every where diſcover traces of the Divine Wiſdom and Goodneſs.

LESSON CXLV. FORTY-NINTH WEEK.

SLEEP OF ANIMALS DURING WINTER.

NOW that nature is deprived of ſo many creatures, which rendered it beautiful and animated, it appears dead. Moſt of the animals that have diſappeared are buried in a profound ſleep for the winter. This is the caſe, not only with the ſnails, but the ants, flies, ſpiders, caterpillars, frogs, lizards, and ſerpents. It is a miſtake to ſuppoſe that the ants lay up proviſions for the whole winter: they lay up a ſtore for autumn, but the leaſt froſt numbs them, and they remain in that ſtate till the return of ſpring. Great part of what they collect in ſummer, with ſo much care, is not for their ſub-

ſiſtence only, they uſe it as materials to build their habitations. There are alſo many birds, who, when food begins to fail, hide themſelves under ground, or in caves, to ſleep all the winter. It is at leaſt aſſerted, that, before winter, the ſhore-ſwallows hide under ground, the wall-ſwallows in the hollows of trees, or old buildings, and the common ſwallows go to the end of ponds, and faſten themſelves in pairs to ſome reeds, where they remain lifeleſs and motionleſs till they are revived by the return of fine weather. There are alſo ſome beaſts which bury themſelves in the ground at the end of ſummer. The moſt remarkable of them is the mountain-rat, which generally makes its abode in the Alps. Though it loves to be on the higheſt mountains, in the region of ice and ſnow, it is ſooner numbed with cold than any other animal; for which reaſon it retires in autumn into its ſubterraneous lodging, to remain there till ſpring. There is much art and precaution in the plan of their winter-reſidence: it is a ſort of gallery, the two branches of which have each their particular opening, and both terminate in a place without any, where they live. One of theſe two wings goes ſloping down underneath their dwelling-place; and it is in this lower part of their houſe that they leave their excrement, which the wet carries away. The other wing is the higheſt, and is their place of entrance in and out. Their dwelling-place is lined with moſs and hay. They make no proviſion for winter, as it would be uſeleſs to them. Before they enter their winter quarters, they prepare themſelves each a bed of moſs and hay; and then, having cloſed the entrance into their houſes, they compoſe themſelves to ſleep. As long as this ſtate of inſenſibility laſts they live without eating. At the beginning of winter, they are ſo fat, that ſome of them weigh twenty pounds; but by degrees they fall away, and are very thin in ſpring.

ſpring. As they do not eat in winter, they have no evacuations. It is ſaid, that as ſoon as theſe animals begin to feel the cold, they go to ſome ſpring, and drink copiouſly for a long time, till what they diſcharge is clear, and as pure as when they drank it. A natural inſtinct prompts them to it, in order to prevent the corruption which the accumulated matter in their ſtomachs might occaſion during their long ſleep. When theſe rats are diſcovered in their retreats, they are found rolled up round, and ſunk into the hay. Their noſe is laid on their belly, that they may not breathe a damp air. During their torpid ſtate, they are carried away without being wakened, and they may even be killed without appearing to feel it. There is another ſort of rats, whoſe ſleep is as long and as ſound as theſe, and are therefore called the ſleepers. The bears eat prodigiouſly at the beginning of winter, as if they meant to eat enough at once for their whole lives. As they are naturally fat, and are exceſſively ſo at the end of autumn, this enables them to bear their abſtinence during their winter's repoſe. The badgers prepare for their retreat into their burrows in the ſame manner. The inſtinct of theſe and many other animals, teaches them thus to diſpenſe with food for a conſiderable time. Their very firſt winter (before experience could inform them) they foreſee and prepare for their long ſleep. In their peaceable retreats, they know not what want, hunger, or cold is; they know no ſeaſon but ſummer. It is remarkable, that all animals do not ſleep thus in winter: it is only thoſe who, with the ſevere cold, can alſo ſupport an abſtinence of ſeveral months. If winter was to come upon them unprepared, and that ſuddenly, weakened and numbed with want of food and the cold air, they ſhould ſtill ſurvive it, the only thing we could wonder at would be the ſtrength of their conſtitution. But as they

know how to prepare in time for their ſleep, with much care and precaution, it muſt be imputed to a wonderful inſtinct beſtowed upon them by the Creator.

LESSON CXLVI.

THE USE OF WOOD.

HOWEVER great, however numerous, the advantages we derive from every part of a tree, yet there is none to be compared to the uſe we make of the wood itſelf. It grows in ſuch abundance, that one might ſay, God every day creates new proviſion of it, that we might never want any thing ſo eſſential to us. It anſwers every purpoſe we wiſh. It is ſoft enough to take any form we pleaſe; and hard enough to keep that which is once given to it; and as it is eaſily ſawed, bent, and poliſhed, it furniſhes us with many utenſils, conveniences, and ornaments. But theſe are not by any means the moſt important advantages; they are only for the purpoſes of convenience and luxury. We have wants ſtill more indiſpenſable, which we could ſcarce ſupply without ſolid thick wood. It is true, that nature furniſhes a great quantity of heavy compact bodies. We have ſtones and marble, of which we make many uſes; but it is ſuch labour to get them out of their quarries, to convey them to any diſtance, or to work them, that it is very expenſive; whereas we may make uſe of the largeſt trees, with very little trouble or expence in compariſon. By ſinking into the ground wooden piles of ſixty or ninety feet long, a ſure foundation is made for walls, even in looſe ſand or mud, which would otherwiſe fall in. Theſe piles ſtrongly driven down, and made firm, form

form a foreſt immoveable, and ſometimes incorruptible, trees in the ground or water, able to ſuſtain the largeſt and heavieſt buildings. It is wood or timber that ſupports the brick-work, and weight of tiles and lead of which the roofs of our houſes are compoſed. Wood is alſo a preſervative of life, as in many places it is our chief fuel. The ſun, undoubtedly, is the ſoul of nature, but we cannot ſteal any of its rays, to dreſs our food with, or to melt our metals. Fire, in ſome meaſure, ſupplies the place of the ſun; and the more or leſs of it, is in our power. The long winter nights, the cold fogs, and the north wind, would freeze our blood, if we were deprived of the comfortable warmth of fires. How neceſſary therefore is fuel to us! Was it not for the wiſeſt purpoſes that the Creator of the world covered one half of the ſurface of our globe with wood, and yet are we not apt to forget this? Do we always conſider as a favour the many uſes it is of to us? Are we ſenſible how much it contributes to our welfare? Or becauſe theſe bleſſings are too common, do we therefore think them of leſs importance? It is true, it is eaſier to acquire wood than gold or diamonds; but is it therefore leſs a peculiar bleſſing of Providence? Is it not preciſely the plenty of wood, and the eaſe with which we acquire it, that ought ſo much the more to excite our gratitude, and lead us to bleſs the Creator of this invaluable gift, the meaſure of which is ſo well proportioned to our wants? Such reflections would prove conſtant ſubjects for thankſgiving, if we accuſtomed ourſelves to this pleaſing, though ſerious turn of mind. Particularly at this ſeaſon we are furniſhed with many occaſions to bleſs God for the mercies he grants to us, and which we ought never to forget.

LESSON CXLVII.

AN EXHORTATION TO REMEMBER THE POOR AT THE SEASON OF WINTER.

THOSE who are quietly ſitting in convenient cheerful houſes, and who hear the whiſtling of the ſharp north wind, let them reflect on their unhappy fellow-creatures, many of whom are ſuffering the utmoſt ſeverity of poverty and cold. "Happy thoſe who at this ſeaſon have a houſe "to ſhelter them, clothes to cover them, bread "and the fruit of the vine to refreſh them, with "a bed of down on which they may repoſe and "yield to pleaſing dreams. But there are ſome "poor perſons without even the neceſſaries of "life! without ſhelter, without clothes, often "ſtretched upon a bed of pain, and too modeſt "to proclaim their wants." We ought all to be touched with the miſery of this order of people. How many poor creatures diſtreſſed with cold and hunger! How many old people with ſcarce any thing to cover them! How many ſick are there without food or nouriſhment, lying on ſtraw, in miſerable huts, where the wind, the cold, and the ſnow penetrate! Winter renders benevolence to the poor more neceſſary, becauſe it increaſes their wants. Is it not the time in which nature itſelf is poor? and is it not adding double value to our benefactions to beſtow them ſeaſonably? If we have been enriched with the ſummer and autumn fruits, was it not with the intention that we ſhould ſhare them with our fellow-creatures, now when nature is at reſt! The more the cold increaſes, the more diſpoſed we ſhould be to relieve the neceſſitous; to pour into the boſom of poverty all we can ſpare. What other end could Providence propoſe

pose in the unequal division of earthly riches, were it not to excite beneficence in the wealthy, by the affecting scenes of the miseries of the poor. Let us therefore have compassion on our fellow-creatures, and not let them suffer more than even the brutes. It is our duty to soften their evils, and Providence permits us to have a share in this honour. It is our duty to clothe, to feed, and to comfort them. Let us then give our superfluity, or share our little with them. No body is so poor that they may not do some good. Let us enjoy the sweetest satisfaction that a noble mind can feel; the God-like pleasure of relieving the wants of others; of softening and lessening their weight of adversity. How easy is it to do this! We need only retract a few of our expences in dress and pleasures. How fit an offering would it be to virtue, were our benevolence to be attended by a conquest over our passions, in retrenching the indulgence of luxury and vanity, in order to bestow our charity on the poor!

LESSON CXLVIII. FIFTIETH WEEK.

NATURE IS A LESSON FOR THE HEART.

WE gain, in every respect, by studying nature; and it may with reason be called a school for the heart, since it clearly instructs us in our duty towards our Maker and our neighbour. Can any thing inspire us with more profound veneration towards God, than the reflection that it is he who has not only formed our globe from nothing, but his Almighty Hand also that confines the sun within its orb, and the sea within its bounds? Can we humble ourselves too much before that Being who created the innumerable worlds which

which roll over our heads? What are we in comparison to those immense globes, and how little must the earth in all its glory appear, when considered in that light! Must we not shudder at the very thought of offending Him, whose boundless power we every moment see proofs of, and who, with a single glance, can destroy or make us wretched? But the contemplation of nature is also highly calculated to fill us with love and gratitude towards its Author. All nature loudly proclaims this comfortable truth, that God is love. It was love which induced him to create the world, and to communicate to other beings the felicity which he himself enjoys. For this purpose, he created the universe, and an innumerable multitude of creatures, that all of them, from the angel to the worm, should feel, each according to its nature and capacity, the effects of Divine Goodness. Is there in reality a single creature, which does not furnish proofs of his immense goodness? But particularly, if we reflect on ourselves, how many may we not find? The Creator has endowed us with reason, not only to enjoy his blessings, but to acknowledge also this love with which he honours us. He hath given us dominion over the animals, to make them subservient to our wants and conveniences. It is also for us that the earth produces fruit in such abundance. So many blessings daily enjoyed, and to which we owe the continuance of our existence; the disinterested love of this great Being, who can receive no return from his creatures, and whose felicity can admit of no increase; can we be insensible to all this? Must it not excite the most grateful love for our bountiful Creator? I cannot conceive it possible for mean and selfish sentiments to fill the heart of man, who, in the contemplation of nature, must every where discover traces of infinite beneficence in the Supreme Being,

who

who does not leſs propoſe the happineſs of each individual, than the univerſal good of the world. If we reflect on the ways of Providence, it is impoſſible not to be ſenſibly touched with the goodneſs and mercy ſhewn to every living creature: and the heart muſt be depraved to a very great degree, which is not inſpired to imitate, as much as poſſible, his univerſal benevolence: for, "God "maketh his ſun to riſe on the evil and on the "good, and ſendeth rain on the juſt and on the "unjuſt."

LESSON CXLIX.

THE VERY THINGS WHICH APPEAR HURTFUL MAY BE FOR OUR BENEFIT.

THE evils we ſometimes meet with enhance the value of our bleſſings, as colours are relieved and ſet off by ſhade. If there was no winter, ſhould we be as ſenſible as we are of the charms of ſpring? Should we know the value of health without ſickneſs, the ſweets of repoſe without labour, the peace and conſolation of a good conſcience, if we had never been tried and tempted? The more obſtacles there are to our happineſs, the greater our joy when we ſurmount them. The heavier our misfortunes are, the more happy we feel when delivered from them. If all our days were proſperous, we ſhould give ourſelves up to luxury, pride, and ambition. If we were never preſſed to it by neceſſity, no body would take the trouble to be active or laborious in buſineſs; no body would make uſe of their talents, nor cultivate their minds; no body would be animated with zeal for the public good. If we were never liable to danger, how ſhould we become prudent, how

ſhould

ſhould we learn compaſſion? If we had no evils to fear, how eaſily ſhould we be intoxicated with happineſs, and forget our gratitude to God, charity towards our neighbour, and all our duties in general! Are not then theſe virtues, thoſe bleſſings of the ſoul, a thouſand times preferable to a conſtant train of pleaſing ſenſations, which would alſo become dull and inſipid to us by poſſeſſion. He who repoſes always in the lap of felicity, ſoon grows negligent of doing good, and is incapable of any great action; but let him feel the ſtrokes of adverſity, and he will recover his wiſdom, activity, and virtue. How unjuſt and inconſiſtent are the deſires of man! They wiſh to live quiet, contented, and happy, and they object to the means which lead to it. In the heat of ſummer we ſigh for coolneſs; and yet we are diſpleaſed when we ſee the clouds collect which are to obtain this for us. Thunder-ſtorms purify the air, and make the earth fruitful; yet we complain that the flaſhes of lightning terrify us. We acknowledge the uſe of coals, minerals, and baths, but we do not like earthquakes. We wiſh that there ſhould be no infectious or epidemical diſorders, and yet we complain of the ſtorms which prevent the air from corrupting. We love to be attended by ſervants, and yet we wiſh there was no poverty or inequality of ſituations. In a word, we wiſh in moſt things for the end without the means. Let us acknowledge the wiſe and beneficent deſigns of God, even when he permits frequent alternatives in our lives, from joy to ſorrow, from happineſs to miſery. Is he not our Father, whoſe goodneſs we ought to be convinced of even when he thinks proper to chaſten us! Are we not in a world ſubject by nature to revolutions? Have we not often experienced, in the courſe of our lives, that what our ignorance made us conſider as an evil, has in reality proved a happineſs to us. Let us then receive with calm

reſignation

resignation the evils with which we are afflicted: they will only appear terrible at first; the longer we are used to them, the more supportable we shall find them, and the more we shall feel their salutary effects. We shall at length be convinced, that without these afflictions, which we now lament, we should never obtain the happiness designed for us hereafter.

LESSON CL.

INCIDENTAL REVOLUTIONS OF OUR GLOBE.

NATURE every day produces of itself changes on the surface of the earth which affect the whole globe. Many ancient monuments prove, that its surface in several places sinks down more or less; sometimes quicker, sometimes slower. The wall built by the Romans in Scotland in the second century, which went across the whole kingdom, from sea to sea, is at present almost entirely under ground; and there are remains of it every day still discovered. The mountains are exposed to the same overthrow, occasioned either by the nature of the ground, the waters which undermine and sap them, or by subterraneous fires. But when some parts of the globe sink down, there are others, on the contrary, which rise up. A fertile valley, at the end of another century, may be converted into a marsh, where clay, turf, and other substances, form beds one over another. Lakes and gulphs turn into land. In stagnant water there grows a quantity of rushes, sea-weed, and other plants. The animal and vegetable substances, by corrupting in it, gradually form a sort of mud and mould; and the bottom at last rises so high, that what was formerly water becomes dry land. The subterraneous fires also produce great changes on our globe:

globe: theſe are called earthquakes. Theſe violent ſhocks and convulſions occaſion great devaſtation, and conſiderable alterations on the ſurface of our planet. The outer coat of the earth breaks in different places, ſink in on one ſide, and riſes up on the other. The ſea alſo partakes of thoſe commotions; and the moſt ſenſible effect that appears from them are the new iſlands which riſe up. They are produced by the bottom of the ſea being raiſed up; or they are compoſed of pumice ſtones, of calcined rocks, or other ſubſtances thrown out from ſome volcano. Hiſtory informs us, that by earthquakes, which ſubterraneous fires occaſioned, whole cities have been ſwallowed up, and ſunk ſixty feet under ground; ſo that afterwards the earth which covered them was ſowed and cultivated. Several of the alterations produced on our globe have been cauſed by the undermining of waters. The courſe of water is often diverted. Even the banks change their place. Sometimes the ſea retires, and leaves whole continents dry, which uſed to be its bed. Sometimes it overflows lands, and covers whole countries. Kingdoms that were formerly cloſe to the ſea, are at preſent removed to a great diſtance from it. The anchors, the great iron rings to moor veſſels, and the wrecks of ſhips found upon mountains, in marſhes, and at a great diſtance from the ocean, prove beyond a doubt, that many places which are now firm land were formerly covered by the ſea. There is every reaſon to believe, that England was formerly joined to France: the beds of the earth and ſtone, which are the ſame on both ſides of Calais, and the ſhallowneſs of that ſtrait, ſeem to prove it. Countries nearer the pole are liable to great change by the ſeverity of cold. In autumn, the water penetrates through a multitude of little crevices into the rocks and mountains. It freezes there in

in winter, and the ice dilating and burſting cauſes great havock. From hence too we may learn, that all things here are ſubject to conſtant viciſſitudes. In all this, how evidently does the wiſdom, power, and goodneſs of the Creator ſhine forth!

LESSON CLI. FIFTY-FIRST WEEK.

OF THE CLOTHING PROVIDED FOR US BY PROVIDENCE.

THE goodneſs of Providence appears even in our clothing. How many animals beſtow upon us their ſkins, their hair, and their fur, for this purpoſe! The ſheep alone, with its wool, furniſhes the moſt neceſſary part of our dreſs; and it is to the valuable labour of a worm that we owe our ſilks. How many plants alſo do we find of uſe in this reſpect! Hemp and flax furniſhes us with linen, and many different textures are formed of cotton; but even thoſe vaſt ſtores of nature would be inſufficient, if God had not endowed man with induſtry, and with an inexhauſtible fund of invention, to contrive and prepare clothing of many ſorts. When we reflect on all the preparations for making linen, we ſhall find how many hands are neceſſary for a few yards only. It ſeems as if we ſhould be but little vain of dreſs, as we muſt have recourſe for it, not only to the animals moſt contemptible in our eyes, but alſo to the rank of people our pride diſdains the moſt. But why has the Creator obliged us to provide ourſelves with clothing, while every animal receives theirs directly from nature? We may anſwer this queſtion by ſaying, that it is for our good. It is, on the one hand, uſeful to our health, and, on the other, adapted

adapted to our way of life. We may, by these means, suit our dress to the different seasons of the year, the climate we live in, the situation and profession we have chosen. Our clothes promote insensible perspiration, so essential to the preservation of life. The necessity of obtaining them for ourselves exercises the human mind, and has given rise to the invention of many arts. And, lastly, the labour it requires furnishes subsistence for a number of trades-persons. We have, therefore, great reason to be content with this plan of Providence: let us only take care not to frustrate the designs proposed by it. A good man ought never to glory in the outward ornaments of his body, but rather in the inward qualities of his mind. Pride assumes many different forms. It inwardly glories in the most trifling advantages, supposes some that do not exist, or else sets too high a value on those that do. And, in regard to the outside, some shew their pride under the splendour of silks, gold, and jewels, whilst others hide and nourish it under rags. The good man will equally avoid either extreme.

LESSON CLII.

THE SAGACITY OF ANIMALS IN FINDING MEANS OF SUBSISTENCE FOR THE WINTER.

THERE are some animals that lay up stores for winter, and in their harvest-time prepare provisions for six months. It might be supposed they foresee a season in which they could not gather food; and that, in guarding against future wants, they can calculate how much they and their families would require. The bees are almost the only insects which lay up provisions for the

the winter. They are wonderful economiſts of their wax, becauſe they can gather no more when the ſeaſon for flowers is over, and have then no reſources for ſubſiſtence, or for making their cells, but what they have already collected. They have alſo the prudence to gather another kind of ſubſtance, which they have occaſion for to keep out the cold from their hives. It is a ſort of glue they extract from the flowers, and from bitter plants, with which they cloſely ſtop up all the holes in the hive. They let nothing be loſt; and what they do not want at the preſent, they lay by for the future. Thoſe who have narrowly obſerved them, aſſure us, that, when in winter they uncover the honey-combs, they carry off the wax with which the cells were ſhut up, and lay it up for future uſe. Amongſt the four-footed animals, the field-mice are thoſe which lay up winter-proviſions, and, in harveſt time, convey a quantity of grain to their ſubterraneous habitations. Magpies and jays are the birds which collect for the winter. They gather heaps of acorns in autumn, which they keep in the hollow parts of trees. The animals that ſleep all the winter make no proviſion, as it would be uſeleſs; but the others are not content with providing for the preſent moment, they think alſo of the future, and it has never been obſerved, that they failed in collecting a ſufficient quantity for that time. Nature prompts the bees to gather wax and honey. They labour during the fine weather, and when winter comes they find their magazines full. Theſe animals, like all others, appear to be led by the rules of wiſdom and prudence. Though conſidered void of reaſon, this wiſe economy, this appearance of foreſight and reflection, muſt neceſſarily be the conſequence of a ſuperior intelligence, whoſe views they fulfil. Thus informed as we are of the great revolutions

which

which await us, and being enabled to look forward to the winter of life, ought we not to lay up for ourſelves conſolations and reſources, which may render the latter end of it not only ſupportable, but happy? Nothing is more miſerable than an old perſon who has paſſed his beſt days with a careleſs indifference about futurity, and finds himſelf in the winter of life, void of every reſource or comfort. Will not ſuch reflections lead us to take early meaſures for our happineſs, not only in old age, but in a future ſtate?

LESSON CLIII.

THE POLAR STAR.

NONE of the northern conſtellations are more remarkable than that which is neareſt to the artic pole, and is called the *Leſſer Bear*. The extremity of its tail is but two degrees from the pole, and for that reaſon it is called the *Polar Star*. It is eaſy to diſtinguiſh it from the ſtars near it, becauſe it changes its poſition very little. It is true, it turns round the pole, but its motion is ſo ſlow, and the circle it deſcribes ſo ſmall, that it is ſcarce perceptible. As it is therefore viſible always in the ſame point of the ſky, it is a ſure guide to the mariner, particularly in the open ſeas. Before diſcovery of the compaſs, the ſailors had no ſurer guide than the polar ſtar; and even at this time, when the ſky is ſerene, they may on many occaſions better depend upon it than on the magnet. This reflection naturally leads us to admire the goodneſs of God, who, by the ſituation and courſe of the ſtars, has given us ſuch a ſure knowledge of times, places, and the different points of the ſky. An aſtronomer, though in an unknown

country,

country, can tell by the ſtars exactly where he is. He can know the month, the day, and hour, as certainly as if he had conſulted the beſt watch. If, for example, we only obſerve that the ſtars come every day four minutes ſooner to the place where they were the day before, we conſequently know that this makes two hours in each month. Thus, the ſtar which we ſee this night at ten o'clock, in a certain part of the ſky, we ſhall ſee it again, the 20th of January, at eight o'clock, if we obſerve it from the ſame place we are now in. The ſtar which is now at midnight to be ſeen over our heads, will a year hence be in the ſame ſpot.

Let us here acknowledge God's tender mercies towards all the world How much thoſe would deſerve pity who have neither clocks or geographical maps, if they could not ſupply the want of them by the obſervation of the ſtars. If we put ourſelves in the place of thoſe people, theſe reflections cannot appear indifferent to us; for we muſt be devoid of all feelings or humanity, if objects which do not indeed directly concern us, but which intereſt ſo many of our fellow-creatures, ſhould appear unworthy our attention. Let us look up with gratitude towards the Creator of all things. The uſe that the ſtars are of, in this reſpect to mankind, is certainly one of the leaſt advantages which reſult from the exiſtence of thoſe heavenly bodies; and yet this advantage alone merits our praiſe and thankſgiving.

LESSON CLIV. FIFTY-SECOND WEEK.

COMPARISON OF MEN AND ANIMALS.

IN the compariſon we are going to make between men and animals, there will be found ſome things which are in common with us and the brute creation;

creation; others in which they have the advantage over us; and, finally, ſome in which we are ſuperior.

Man chiefly reſembles animals in reſpect to matter. We have, like them, life and organized bodies, which are produced by propagation and birth, and ſupported by food. We and they have alſo alike animal ſpirits, powers to fulfil the different functions aſſigned to us, contrary motions, the free exerciſe of our limbs, ſenſes, ſenſation, imagination, and memory. We are equally liable to thoſe general bodily accidents which the chain of things, the laws of motions, the conſtruction and organization of our bodies, muſt neceſſarily occaſion.

In reſpect to the happineſs reſulting from ſenſual pleaſures, animals have many advantages over us. One of the chief is, that they do not require the clothes, defence, and conveniences we want; nor are they obliged to invent, to learn, and exerciſe the arts neceſſary for theſe purpoſes. At their birth they bring with them every thing they want, or at leaſt have only to follow the inſtinct which is innate in them, to obtain all that can make them happy. This inſtinct never deceives them: it is a conſtant ſure guide: and as ſoon as their appetites are ſatisfied, they are perfectly content, they deſire no more, and are never guilty of exceſs. They enjoy the preſent without troubling themſelves about futurity. There is every reaſon to believe that animals have not the faculty of repreſenting to themſelves the future. A ſenſe of the preſent warns them of their wants, and inſtinct teaches them how to ſupply them: they never think of the morrow. Death itſelf comes upon them without their having foreſeen it, or being diſturbed about it before-hand. In all theſe circumſtances they have the advantage of man, who muſt reflect, invent, labour, exerciſe, and receive inſtructions, or he would remain in perpetual childhood, and could ſcarce procure himſelf the

the neceſſaries of life. His inſtinct and paſſions are not ſure guides to him. He would be wretched were he to give way to them. Reaſon alone and its conſequences make the eſſential difference between him and the brutes: it ſupplies all deficiencies; and, in other reſpects, gives a ſuperiority to which they can never attain. By means of this faculty, he not only obtains every neceſſary and convenience, but alſo multiplies the pleaſures of ſenſe: it ennobles them, and makes them ſo much the more ſenſibly enjoyed, as he can render his deſires ſubſervient to reaſon: his ſoul is capable of pleaſures entirely unknown to animals: pleaſures which ſpring from ſcience, wiſdom, order, religion, and virtue, and which infinitely ſurpaſs all thoſe of which the ſenſes are the organs. Let us add, that animals are confined within a very narrow ſphere; that their deſires are very few, and conſequently their pleaſures are little varied; whereas man has an infinite number of them: he draws ſome out of every thing; and there is nothing which he cannot make uſe of ſome way or other. He makes continual new diſcoveries, acquires further lights, and makes boundleſs progreſs in the road to perfection and happineſs; whereas the beaſts are always confined within their narrow limits, never invent or improve, nor ever riſe above other animals of their ſpecies. It is reaſon alone, then, that gives us the ſuperiority over the brute, and it is in this that the excellence of human nature moſtly conſiſts. To make uſe of our reaſon in order to ennoble the pleaſures of ſenſe, and to enjoy more and more thoſe that are intellectual, ſo as to improve daily in wiſdom and virtue, this is what diſtinguiſhes man: this is the end for which he was created. Let it then be our conſtant ſtudy to anſwer this purpoſe; for we can only be happy in proportion as we follow what reaſon points out to us as uſeful and right.

LESSON CLV.

INSTABILITY OF EARTHLY THINGS.

THERE is nothing in nature that is not liable to change. Every thing is uncertain and frail. Nothing is durable enough to remain always like itſelf. The moſt ſolid bodies are not ſo impenetrable, nor their parts ſo cloſely united, as to preſerve them from diſſolution. Each particle of matter inſenſibly changes its form. How many changes has each of our bodies undergone ſince its formation in our mother's womb? Every year it has loſt ſomething of what made a part of itſelf, and has acquired new parts drawn from the mineral, vegetable, and animal ſubſtances. Every thing on earth increaſes and decreaſes by turns; but with this difference, that the changes do not operate as quickly in ſome bodies as in others. The celeſtial globes appear to be ſtill the ſame as at the moment of their creation; and they are perhaps the moſt invariable of all bodies. Thoſe, however, who have obſerved them with attention, perceive that ſome ſtars have diſappeared, and that the ſun has ſpots which change, and thus they prove that it is not conſtantly the ſame. Its motion alſo makes it liable to variation: and though it is never extinguiſhed, it has been obſcured by fogs, clouds, and even by internal revolutions. This is all we can know of it at the immeaſurable diſtance there is between us. How many other external as well as internal changes we ſhould diſcover, were we nearer! If we are ſtill more ſtruck with the inſtability of earthly things, it is becauſe they are within our view. And how frail are theſe! how liable to change! Each object continues to look like itſelf, and yet how different in reality is it from what it was! We daily behold things taking new forms: ſome growing, others diminiſhing and periſhing. This year, which

which in a few days will be at an end, affords undeniable proofs of it. In each perſon's own little circle, they muſt have experienced many revolutions. Several of thoſe we had known for many years are no more: many whom we have ſeen rich are become poor, or at leaſt are but in an indifferent ſituation. If we examine ourſelves alſo, we ſhall find a difference in many reſpects. Has not our health and activity diminiſhed? And are not all theſe things warnings of approaching towards that great and final revolution which death will operate upon us? Beſides, there are many changes may ſtill happen in the few remaining days of this year. We may become poor or ſick; we may experience the infidelity of friends, or even die, in that ſpace of time. Such reflections might inevitably oppreſs and ſink us to deſpair, if religion was not our ſupport and conſolation. But this leads us to the only invariable, everlaſting Being, whoſe very nature is immutability, and whoſe mercy has no end. Full of confidence, therefore, in his unchangeable goodneſs, let us ſubmit with reſignation to all the changes in this tranſitory world.

LESSON CLVI.

CALCULATION OF HUMAN LIFE.

THE approaching cloſe of the year leads me to reflections which, however important they may be, do not always occupy me as they ought. In order to feel more inſenſibly how ſhort the date of life is, I will examine now the uſe I have made of the paſt days; though I have reaſon to believe it will prove a ſubject of humiliation to me.—I firſt recall to myſelf thoſe days it was not in my power to command. How many hours then employed in mere bodily wants? How many more have paſſed in trifling

trifling occupations of no ſervice to the mind? Thus, in ſlightly looking over the uſe made of theſe years, I diſcover a multitude of days loſt to the immortal ſoul, which inhabits this body of clay; and, after theſe deductions, what will remain which I may juſtly ſay have been employed for real uſe? Out of 365 days, it is plain, that I can ſcarce reckon fifty which I can call my own, as having promoted my eternal happineſs. And the little that remains of time, how much do I loſe of it by my own fault and weakneſs! With ſome, how many days have been ſacrificed to vice and folly! Perhaps many of thoſe days granted me for reflection have been devoted to the world, to vanity, to idleneſs, and falſe pleaſures. Perhaps they may have been profaned by envy, jealouſy, ſlander, and other vices, which betray a heart void of reſpect for our Maker, and charity to our neighbour. Even ſince God has made me better, and inſpired me with a deſire to walk in his paths, how much time has been irrecoverably loſt in thoughtleſſneſs, indifference, doubts, anxiety, want of temper, and all thoſe infirmities which are the effects of our frailty, and weakneſs of reaſon. Laſtly, how ſwiftly does the little ſpace of time we can diſpoſe of fly away! A year paſſes almoſt inſenſibly, and yet a year is of great conſequence to a being whoſe life is reckoned by hours. When we recollect how little of it we may have ſpent ſuitably to the purpoſes of our creation, we might well wiſh to recall thoſe hours which were ill employed: but it would be in vain. The year, with the good and bad actions which have marked it, are ſwallowed up for ever in eternity.

Forgive us, then, O merciful Father, the faults we have committed; and grant us thy grace in the hour of death, in the day of judgment, and to all eternity.

FINIS.