

1858
Smithfield
reformatory

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Houses of the Oireachtas

LECTURES

ON

EDUCATIONAL, SOCIAL, AND MORAL SUBJECTS,

DELIVERED TO THE INMATES AT THE

SMITHFIELD REFORMATORY INSTITUTE,

DUBLIN,

BY JAMES P. ORGAN.

DEDICATED, BY EXPRESS PERMISSION,

To His Excellency,

GEORGE WILLIAM FREDERICK, EARL OF CARLISLE, K.G.,

Lord Lieutenant General, and General Governor of Ireland,

&c. &c.

“ Parum est improbos coercere pœnâ, nisi probos efficias disciplinâ.”

DUBLIN :

W. B. KELLY, 8, GRAFTON STREET,

AND ALL BOOKSELLERS.

1858.

LECTURES

ON THE

PHYSIOLOGICAL, SOCIAL, AND MORAL SUBJECTS,

DELIVERED IN THE LECTURE ROOMS AT THE

SMITHSONIAN INSTITUTION

DURING

THE YEAR 1853.

BY

GEORGE WILLIAM RICHMOND

OF THE UNIVERSITY OF DUBLIN

AND

BY

WILLIAM RICHMOND

W. RICHMOND & G. RICHMOND

AND ALL BOOKSELLERS

1853

Houses of the Oireachtas

Dedication.

TO HIS EXCELLENCY

GEORGE WILLIAM FREDERICK, EARL OF CARLISLE, K.G.,

Lord Lieutenant General and General Governor of Ireland, &c.

On the twentieth day of February, Eighteen hundred and fifty-six, your Excellency first did me the honor, out of your great condescension and regard for the cause in which I was engaged, to attend a Lecture, delivered by me to the men who were at that period inmates of Smithfield. From that day until the present your Excellency has been a most constant visitor to the Institution, cheering by your presence, encouraging by your approbation, and strengthening by your evident and undoubted interest in our success. I do not mean in my success, or in the success of any officer in the Institution, but in the success of men and officers; because, as your Excellency knows, in Smithfield there can be no success, no fulfilment of hope, in which men and officers are not equal participators and equal workers.

Emboldened by the words of kindness which your Excellency sometimes addressed to me, I had the temerity some months ago to beg that you would permit me to dedicate some of my Lectures, which I

was about to print, to your Excellency, and I distinctly stated at the time, that I should print none, save those at the delivery of which your Excellency had been present. To my request you acceded in terms of kindness and encouragement.

The Lectures are now before your Excellency ; I shall say nothing in excuse or apology for them ; you know the men to whom they were addressed ; you heard the Lectures, and I shall only say to your Excellency, in the words of Milward's Dedication of Selden's "Table Talk" to Mr. Justice Hales :—

"In reading be pleased to distinguish times, and in your fancy carry along with you the *when* and the *why*, many of these things were spoken ; this will give them the more life, and the smarter relish."

It is possible the entertainment you find in them may render you the more inclinable to pardon the presumption of

Your most obliged and

Most humble Servant,

JAMES P. ORGAN.

Smithfield Reformatory Institute,
New Year's Day, 1858.

PREFACE.

TO THE
FIRST OF THE ANNUAL SERIES OF LECTURES,
*Delivered at the Smithfield Government Reformatory
Institution, Dublin.*

There is no fallacy more common than one which leads the great mass of mankind to assume that the vast majority of criminals are different from other human beings. During the twelve years before the date of my appointment as Lecturer at the Smithfield Reformatory, I had been constantly engaged as a teacher of adults, and during my experience of Smithfield, I have not been able to discover that the ordinary class of well-conducted convicts are in any respect, in mind, morals, passions or feelings, inferior to the generality of those of their class in life whom it was my duty to instruct before I became connected with the Convict Service.

He who would become a lecturer to convicts (or indeed to persons of any class) must bear two particulars in mind:—first, that being men, they must not be talked down to, or treated as children; second, that they must never for one moment perceive, that when once received into the highest class of good-conduct men, they are ever suspected of

falsehood or dishonesty. If, indeed, the person who lectures, could adopt that plan which distinguished Dr. Arnold's management of Rugby School, and induce the men to believe, as he induced his boys to believe, that the possibility of their telling a falsehood could never enter the mind of the lecturer, an amount of good, impossible of conception to those unacquainted with the character of prisoners, would be the consequence.

I would beg every person, teacher and lecturer, to remember that he is not placed in his position for the sole purpose of teaching men to spell, and calculate, and write, and answer ; he has a higher duty to perform, and which is, that whilst imparting School-teaching to those under his charge, he should make himself thoroughly and throughly acquainted with every phase of their minds, and with every shade of their dispositions. He should learn their past lives, their hopes for the future, their joys and sorrows, their desires and their aspirations, and aid them in carrying out every reasonable hope of advancement and success in that new life which shines before every prisoner who longs hopefully and with a reformed mind, for the throwing open of the prison portals.

If the prison lecturer or teacher, is unwilling to, or incapable of, undertaking this task and facing these toils, he is unworthy of his office, and may be a curse where he should be a blessing.

Prison teachers and lecturers may say that I ask them to do that which is not their duty, and for

which they are not paid ; I have heard this cry over and over again, and it always reminds me of a passage in Dean Swift's *Instructions to Servants*. The Dean is pointing out to the footman how not to do his duty towards his employer, and he writes :—" If your master shall say to you, ' John, the stable door is open, shut it,' you may say, ' Please your honor, *I don't understand horses.*' " Precisely in this *I-don't-understand-horses-style* of self-excuse from hard work and from right work, do those prison teachers and lecturers seek to exonerate themselves, who declare that any work coming within their sphere is not their work, because it may not be precisely within the letter of those duties, for the discharge of which they are paid. Putting of till to-morrow, what may be done to-day—putting off till we are paid for the doing of that which we see could be usefully done, will always recoil injuriously upon the work of him who acts thus, even though he should blind himself with the poor, lazy plea, of good intentions.

Hell, we are told, is paved with good intentions ; but there is a grand and a brave moral in the late Archdeacon Hare's gloss upon this saying, " Pluck up the stones, ye sluggards, and break the devil's head with them."

If the lectures comprised in this volume shall be found useful to men holding such an office as I hold, my best wishes and hopes will be completely fulfilled. These Lectures will be found to exhibit neither learning nor eloquence, as my intention in preparing them

was to draw my hearers up to the level of the ordinary comprehension of industrious mechanics, and to afford them matter for thought. Their wonder I easily excited, because, as Dr. Johnson tells us, "All wonder is the effect of novelty upon ignorance;" and having excited their wonder, I showed them how, through books, they might gratify it, and having once opened to them the gorgeous panorama which books unfold, I found that they required no spiriting to urge them onward in the pursuit of knowledge, commensurate with their intellects, and compatible with their tastes.

My great object was to talk *to* them, rather than *at* them, as is the great error with those who lecture to this class, and I have never found that when once we had got to understand each other, my audience and myself differed in our appreciation of the subject, or in a community of interest and feeling on the topic upon which we were engaged.

I do not offer these Lectures as models or as specimens. I present them merely as records of subjects which have instructed and interested Irish Convicts, and may, perhaps, contain hints to men, holding a position like mine, for topics which may instruct and interest convicts, in other portions of Her Majesty's Dominions.

JAMES P. ORGAN.

AIR.

It is to be very much regretted that in this enlightened age men should be found so ignorant of the nature of many important things, with the names of which they have been familiar from their very infancy, but into the great utility of which they never thought of inquiring. Who is there that has not heard of air? yet how very few know what it is, or how necessary it is to the existence of every living thing, from man, the head of the creation, down to those insects so small, that a drop of water to them is a world as great as the globe we inhabit is to us. And again, in the vegetable world, air is as necessary to the tiniest blade of grass which grows, as it is to those majestic trees that contribute so much to the beauty of nature, and confer innumerable benefits and comforts on man.

We can live for a time without food; for a longer time perhaps without clothes; but not for a single instant without air.

Asleep or awake we equally require air to support our lives, but, unlike all other things given unto us by a good and bountiful God, we cannot take it in quantities such as we wish or when we wish, it being given to us at all times with a regularity and constancy that clearly bespeak the great care of Providence for his creatures—and ungrateful and unthankful creatures too.

Now as air is so necessary to your existence, I am sure you would like to know something more about it than you do just at present. Well, if you pay attention to me, I think I shall be able to make you understand some of the principal facts connected with this interesting subject, which it is desirable that every one should know, and while giving you useful information, let me also hope I shall be able to show how good God is, and how bountifully he deals out those blessings so necessary to the comfort and happiness of man.

Respiration.—Air is constantly entering into and leaving the lungs of animals, and this coming in, and going out, of air, is termed Respiration, or, as you call it, “breathing.” We take the air into our lungs by expansion, and we force it out through our mouth and nose by means of the action of the chest called *compression*; you are all well acquainted with that common household article, a hand-bellows; you must have observed how the air rushes in when the boards forming the top and bottom are drawn apart, and how it is forced out through the pipe when they are again pressed together; well, the opening out and pressing in of these parts of the bellows will furnish a good notion of what is meant by expansion and compression, and the operation of breathing or respiration is nothing more. Now though the air taken into the lungs remains there but a moment, yet it undergoes a very great change in that short time, by which all the nourishment required for our bodies is obtained: for it is to the effect produced in that brief period that the blood, so necessary to the maintenance of life, owes the entire of its sustaining qualities. But the air, on leaving the lungs, differs very much from what it was when entering them, so much so that, if we were to inspire it, that is, to take it into our lungs many times, it would deprive us of life; you can see from this how dangerous it is to breathe the same air several times, how easily it is corrupted, and the necessity there is for keeping up an abundant supply of it in its purest and freshest form.

Air Material.—The air being very light, and in calm weather offering so very little resistance as we move through it, one is apt to think that it possesses no substance; that, in fact, it has neither length, breadth, substance, or weight, that it is *nothing*. Well, I should tell you that men cleverer and more learned than any of us, thought so too; but these persons lived some thousands of years ago, long before the birth of our Lord, and are, on

that account, called *ancients*. The opinions of these men have been proved by others living in modern times to be very wrong, for the latter have clearly shewn that air consists of no less than four very curious substances blended together, but in such a way that it is only the great Creator himself could have contrived it.

Weight and Momentum.—I have not told you what these substances are of which the air is composed, but I shall do so by and by. Of course you will take for granted that what I say at present is entirely true; namely, that air is a compound substance, that is, made up of more things than one. Now, anything so made up is said to be *material*, that is containing matter of some sort, and you will remember that anything material must have *weight*. Well, air being a material substance must have weight, and so it has, and very great weight too, though it appears to you and to me very light indeed.

Have you not heard of very huge trees and very large houses being blown down? You all say you have, and many of you, I dare say, have seen them after having been blown down. If you were asked what blew them down you would at once say the *wind*, and you would be quite right in saying so. But do you know that wind is nothing more or less than the air, that seems to you so light, put in *motion*. Must it not strike you that if air had no weight, no matter how quick its motion, it could never have uprooted trees, laid waste large districts of country, and brought to the earth castles and dwellings of enormous size and solidity?

How Weighed.—I think you must find very little difficulty from what is here stated in believing, and of course understanding too, that air has weight: but you may very naturally say to me, how can its weight be known? This is a question very easily answered, and if you pay attention to me I think I shall explain it to your satisfaction.

Before I attempt to tell you how air is weighed, I must first see if you know what is meant by solid or cubic measure.

[Here I proceed to examine, and at the same time explain to those who know nothing of it, what is meant by cubic measure. I find very little difficulty in making my audience understand the three kinds of measures, viz., lineal, square, and cubic, being provided with a simple, but effective apparatus, a box of solids, for the purpose to which I take care to draw particular attention.]

Now that you understand what is meant by cubic measure, and that a cubic or solid foot of anything must measure a foot in length, a foot in breadth, and a foot in depth or thickness, I think you will understand what I am about to tell you as to the way in which air is weighed. It has been proved by men whose authority the world respects, that a glass flask, or bottle containing a cubic foot of air, weighs something more than an ounce heavier with the air in it than with the air out of it.

This has been shown in so simple a manner that the dullest can understand it—a bottle is provided with a cock of peculiar construction called a stop-cock on the top of the neck, say, and by means of a syringe the air in the bottle is pumped out, (just as you would take water from a vessel with an ordinary syringe.) When the air is removed the stop-cock is closed, and the bottle or flask as I have told you is found to weigh over an ounce less than what it weighed when the air was in it. Is this not a very simple and practical proof that air has weight? Is there any man amongst you who cannot understand it? If there be, let him say so, and I shall be happy to go over the explanation again and again; for, if every man does not understand what I say, he can derive no benefit from this or any other lecture or discourse delivered by me, and if this be the case, the men are deceiv-

ing themselves and me, by pretending that they understand and value what I say.

Weight relative to that of water.—Well, I am inclined to believe that you all comprehend me so far, so I shall proceed with my subject. A cubic foot of air, I have just stated, weighs more than one ounce, indeed I might say one ounce and a quarter. Now a cubic foot of water weighs a little more than 997 ounces, so it would be found by calculation, if we had time to make such, that water is nearly 773 times heavier than air. It is stated that 36 cubic feet of water weigh a ton, if so, 773 times 36 cubic feet of air will weigh a ton. which would be about 27820 cubic feet of air, an important fact which you will do well to remember.

The Atmosphere.—Having made these remarks upon air, I shall proceed now to speak of the great atmosphere itself, which is nothing more or less than the entire mass of air that surrounds the world, to a height of nearly fifty miles. If it were water that surrounded the globe, as air does, would not the pressure of it on the earth be tremendous? for you know how much heavier water is than air. The pressure of the atmosphere is very great, nevertheless we are not injured by it, for reasons to be presently stated.

One single fact will show you the great weight of the atmosphere. Hold your hand out before you, mark upon it what you think to be about a square inch. Now the weight of the atmosphere even on so small a part of the surface of your body is equal to 15lbs., or 1lb. more than a stone weight, for that square inch supports a column of air nearly fifty miles in height.

Pressure.—Before I can proceed further with this simple, but important subject, I must tell you that air is a fluid, but of such a nature that we cannot see it. It has no colour, at least that can be seen with the naked eye; and

of all known transparent bodies, that is those, which we can see through, such as glass and water—it is the thinnest and most transparent.

Now you must bear in mind that any pressure a fluid puts forth or exercises on any thing coming in its way is scattered over the whole object in every possible manner, so that instead of its weight falling right down upon the upper surface of anything under it or in it, as you might suppose, it presses as much under the object as over it and as much one side as on the other ; in fact on every part of the surface the object receives the same weight or pressure. Perhaps you can understand me better by my telling how you yourselves might prove the truth of what I say, Get any number of empty bottles you wish and cork them well ; before corking them, put a sufficient weight in each so as to make it sink in the water. Put them in the water, the neck of one upwards, the neck of another downwards, the neck of another horizontal, and so on in every direction you can possibly think of, and after they have sunk to a certain depth, you will find that the corks of all will be forced in, and every bottle filled with water. And remember that the cork of each bottle is forced in exactly at the same time, and that the force that drove in any one cork in any one bottle is in every case of equal power.

Thus it is seen that the pressure of water acts equally, and at the same time in every direction. You can clearly perceive from what I have said that a fish, or any other living thing in the water, receives the pressure of that element as much on the upper part of its body as on the lower, and as much on the sides as on any other part of it.

It is to this grand property of fluids, this grand token of the wisdom of Him who made all things, must be attributed the fact, that animals can exist on this earth or in the waters of the deep. What I have said of water applies to air and all sub-

stances in a fluid state. If the pressure of air did not exercise an equal force in every possible direction on every part of the surface of anything exposed to it, and at the same time, who or what could live upon the earth? What a great load a ton weight is for some of the strongest animals to draw? What destruction it would cause, if at this moment a ton weight of iron were to fall amongst us? would it not kill many of us? nay, crush us to atoms; and yet by the wise provision of God, the helpless new born babe supports a far greater pressure at the first moment it sees the world.

It is on account of this property of the air that each and every one of us is able at this moment to support a pressure of nearly 14 tons without feeling the least inconvenience or pain. Which of you here present does not wonder at this? Who is there that meditates on the power of God displayed in his works, but must be terrified at bidding defiance to his law;—to laws made for the good, and for the benefit of all mankind. Who, again, let me ask, can cast his eyes towards Heaven, and behold the glorious sun by day, or the million stars by night, without being moved to amazement, if not to gratitude, at the works of Him who gave those things for the use and benefit of ungrateful man? Oh! were it not that his mercy is greater than his works, what would become of us? But let us not dwell too much on this. No, let us rather wonder how we could be permitted to encroach so far on his patience, and while we thus wonder at his mercy, let us remember with St. Augustine, that “God is patient because he is Eternal,” and let us endeavour to reach those regions, where the beauties of the works, and the splendour of the divine workman, will be unveiled to our eyes.

Why bodies are not crushed by the air.—Now I know it appears very strange that we are able to bear unhurt such an immense weight as that I have just mentioned to you, for such a pressure as 15lbs on every square inch of sur-

face is greater perhaps than you can just now imagine. Let us see how it is that we are not crushed to atoms by the immense weight of 14 tons, pressing on our bodies. You remember my telling you that we take in air by means of our lungs, and that air, like every other fluid, presses on any object exposed to it as much one way as another.

Well, of course, you know that the blood in our veins is a fluid, and you also know that the air taken into our bodies enters into the lungs, and into every little opening or aperture let it be ever so minute, for it fills all space.

When the blood comes in contact with the freshly inhaled air, of course it is exposed to its pressure like every thing else, and as the pressure must act from the inside, the blood must be inclined to force its way outside, and so it would were it not that the same force which tends to drive the blood in an outward direction from within was also pressing against it from without, namely, the *air*, for you know I proved to you that all fluids press equally and at the same time in every direction.

The blood which fills the veins in our bodies, is exposed to the pressure of the air, just the same as the outward surface of our bodies. Entering our bodies through our lungs, as you are already aware, filling up every portion inside, and causing the fluids in the interior of the body to send the pressure all over it, communicating to it, by this means a tendency to press outwards, and this pressure is equal in every respect to that from the air without. In fact, it is the same and caused by the same agent, the *air*.

Cupping Glass.—If you listen attentively for a few moments, I think I shall be able to show you more clearly that it is in consequence of the inside and outside pressures being identical that we do not feel any inconvenience from the great pressure of the atmosphere. You have all heard of people being cupped for different diseases. Now the opera-

tion of cupping is effected by applying the mouth of a cup to the surface of the body, and withdrawing the air from within the cup, thus removing all external pressure from that part, taking care of course that all communication with the air without is prevented. When this is done the effects of the pressure from within will be clearly seen at once, as it is not resisted by the pressure of the air outside. The skin covered with the glass swells up, and in this state the cupping instrument is applied to the skin, and causes the blood to issue out at once, an effect which is of course owing to the pressure of the fluid within.

Thus you see how wonderful and yet how simple are the wise provisions of God for his creatures.

Compressibility of Air.—Air is capable of being pressed so as to occupy smaller and smaller space just the same as if you were to press bran or any such substance in a tub. Heat also readily changes it from thick to thin.

Indeed it is to this property of air that the draft always observed at a fire place is due; for the air about the grate is made thin and light by the heat of the fire, and consequently must ascend, so it rushes up the chimney and makes its way out every way it can, and then the cold and heavier air rushes in to supply its place, which becoming heated in its turn ascends also, and the constant rushing in and out of the air causes the draft. Now you will be surprised to hear that on the very same principle are the winds of Heaven carried on; but I shall explain this more fully hereafter.

When I told you a while ago that there is a pressure of 15lbs of air on every square inch of surface, I should have told you that this is only the case when we are so near the earth as we are at present; for in this situation we receive on every square inch of the surface of our bodies the weight of a column of air having a square inch

for its base ; and that column is said to be from 45 miles to 50 in height, this being the height of the whole atmosphere, or the air which surrounds the globe. Now it is evident that as we ascend into the air this column of air must get shorter ; the same bulk becomes also proportionately lighter and consequently its weight must grow less ; so it does, and hence the pressure of air on the top of high mountains is much less than at the base. Persons who ascend a great distance into the air suffer from its great lightness, and sometimes the same effects are produced on them as those which result from the cupping glass which I have already described. Noise is heard in the ear, small air vessels burst, and frequently blood issues from the nose and other portions of the body.

Composition.—At the commencement of the lecture you may remember I told you that air was made up of several ingredients, but I did not say then what these ingredients were.

I must do so now, as I think I cannot well proceed without making you acquainted with them.

It may seem strange to you that an invisible substance—such as the air is, can be taken, examined and divided into other substances, yet the operation is quite easy and simple, and if we had here the proper means for making the experiment, I could prove to your full satisfaction that it is not more difficult to separate from each other the different airs or gasses as they are called for the sake of distinction, of which the “air we breathe” is composed, than it is to remove the dross from gold, or silver, or any other ore. These airs or gasses are found to be principally two ; oxygen which signifies acid-maker, and nitrogen, which means nitre-maker, and because every 100 gallons of common air contain about 20 gallons of the first and about 80 of the last mentioned gas, it is sometimes re-

garded as consisting of these two alone, which is by no means the case. The air contains several other substances, though in very small quantities, two only of which we shall now notice, as they perform most important parts in the "economy of nature," that is the skilful management which appears in all the works of the wise Creator, by which every want of the creature is supplied, and every means provided to maintain and continue it in existence,—these two substances are carbonic acid and water in the state of vapor. Now the four substances we have mentioned are found blended together in the air in all places. For there is a law, as it were, by which gasses are regulated, and which it will be well to recollect, and that is, though they be of very different weight, the moment two of them are brought together, far from the heavier one falling to the bottom as water does when poured on oil, they begin slowly to unite with each other till they become completely and thoroughly mixed.

We shall now proceed to examine their qualities or "properties" as they are called, and their uses. Recollect now the names of these gasses—Oxygen, Nitrogen and Carbonic Acid—I repeat them, the better to fix them on your memory. Nitrogen is the first of these that demands our attention, as there are four times as much of it in the air as there is of Oxygen, though it is Oxygen that supports animal and vegetable life, as well as combustion—that is, it is the presence of this gas that causes substances to burn and show light, such as fire, gas, candles, &c., &c. Oxygen and Nitrogen gas have neither colour, taste nor smell. The nature of these gasses widely differs; for instance, if a candle or any blazing substance were placed in Nitrogen gas, it would immediately go out, and if an animal were introduced into this gas its life would instantly pass away. Now with Oxygen the contrary is the

case, all substances that burn in the common air will burn more brilliantly and more rapidly in Oxygen. The least spark on a piece of wood or any other substance is immediately turned into a flame, the moment it is put into a vessel containing Oxygen gas. The absence of Oxygen for a moment would cause instant death. It is heavier than either Nitrogen gas, or the air around us, but indeed very little, as you will learn from their respective weights which are as follows :—

100	Cubic inches of Oxygen	weigh	$34\frac{1}{4}$	grains
100	„ „ „	Nitrogen	$30\frac{1}{6}$	„
100	„ „ „	Common air	31	„

Carbonic Acid Gas.—It may be more difficult perhaps to remember the name of the other gas, that is the Carbonic Acid, but I cannot help this. If I could give it a new name I would, and a very simple one too: I should call it the killing gass. This gas is what remains after the Oxygen or life-surporting gas has united with a portion of the substance burned in it. Listen to me now while I give you an example of what I mean. Suppose I had a jar of Oxygen gas before me at the present moment, and I threw a piece of lighted charcoal into it (this is a piece of charcoal which I hold in my hand) the charcoal will, as I have told you just now, burn very rapidly and very brightly, but, after a little, it will burn with less and less brightness, until it at last goes out. Now instead of Oxygen being in the jar when the charcoal goes out, or is extinguished, we will find it to be Carbonic or life destroying gas; and if a lighted candle or any lighted substance be placed in it, it would immediately go out. This gas is heavier than Oxygen; it is most destructive to life, and therefore unfit for respiration, and is produced by the burning of fire, candles, lamps, and so on. That produced by the fire in our rooms does us no harm, as it

escapes up the chimney ; but that produced by the burning of lamps and candles finds its way up to the top of the room, and there floats about the ceiling, and if provision is not made for its escape, it will descend and mix again with the air about us, poison it, and consequently render it most destructive to health. You see therefore how necessary it is to have some place towards the top of the room through which this gas may escape—all public buildings have, and you should see that something is done about it also when you return once more to your own humble and I trust happy homes. When you are providing for the letting in of good and the letting out of bad air, you are said to provide for the ventilation of the house or room as the case may be ; and to know how to do this effectually at all times is a most necessary and important branch of knowledge. There are very few substances which do not contain Carbonic Acid gas. Soda water, ginger beer, and even water itself, contain this gas. By boiling water we drive away this gas, and it is the absence of this gas, that gives boiled water its very insipid taste, while its presence gives to many liquids a pleasing and sometimes a pungent or acid taste.

This gas sometimes floats about the bottoms of old wells, and again, the earth itself gives it forth in many places in such abundant quantities as to produce most destructive effects. Its fatal qualities are tested by showing that small animals let down into the low situations where it abounds instantly die. The following interesting account of the Poison valley, in the island of Japan, by an eye-witness, will elucidate what I state :—

We took with us two dogs and some fowls to try experiments in this poisonous hollow. On arriving at the foot of the mountain, we dismounted and scrambled up the side about a quarter of a mile, holding on by the branches of trees. When within a few yards of the

valley we experienced a strong, naueous suffocating smell, but on coming close to its edge, this disagreeable odour left us. The valley appeared to be about half a mile in circumference, oval, and the depth from thirty to thirty-five feet ; the bottom quite flat : no vegetation ; strewed with some very large (apparently) river stones, and the whole covered with the skeletons of human beings, tigers, pigs, deer, and peacocks, and all sorts of birds. We could not perceive any vapour or any opening in the ground, which last appeared to us to be of a hard sandy substance. It was now proposed by one of the party to enter the valley ; but at the spot where we were, this was difficult at least for me, as one false step would have brought us to eternity, seeing no assistance could be given. We lighted our cigars, and, with the assistance of a bamboo we went down within eighteen feet of the bottom. Here we did not experience any difficulty in breathing, but an offensive nauseous smell annoyed us. We now fastened a dog to the end of a bamboo eighteen feet long, and sent him in ; we had our watches in our hands, and in fourteen seconds he fell on his back, did not move his limbs or look round, but continued to breathe eighteen minutes. We then sent in another, or rather he got loose, and walked into where the other dog was lying. He then stood quite still, and in ten minutes fell on his face, and never after moved his limbs ; he continued to breathe seven minutes. We now tried a fowl, which died in a minute and a half. We threw in another, which died before touching the ground. During these experiments we experienced a heavy shower of rain ; but we were so interested by the awful sight before us, that we did not care for getting wet. On the opposite side, near a large stone, was the skeleton of a human being, who must have perished on his back, with his right hand under his head. From being exposed to the weather, the bones were bleached as white as ivory. I was anxious to procure this skeleton, but any attempt to get it would have been madness.

It may be well perhaps to tell you that this gas is sometimes met with at the bottom of wells, shafts of mines, and like situations, where it receives the significant title of *choke-damp*. This gas is, as I have already stated, much heavier than air, and can be poured like water or other fluids from one vessel into another ; but when it comes in contact with another gas it mingles with it, notwithstand-

ing its weight ; for all gases, as I told you before, mingle with each other no matter what may be their difference of weight.

Though the quantity of Carbonic Acid in the "air we breathe is very small, say about two gallons in every 5000 ; there are times in the year in which it abounds more than at others. In Autumn, if we take a walk through groves or plantations, after the fall of the leaf, we must inhale quantities of this gas ; because the decaying of any animal or vegetable matter produces it abundantly. And here I may observe that every time we breathe, we give out large portions of this gas, thereby corrupting the atmosphere around us ; so you see how prejudicial to health it must be to remain in a crowded room, where proper precaution is not taken to permit it to escape ; in fact each individual has the same property of corrupting the air, as a large candle, or lamp ; and the result is still worse, if the room be lighted by artificial means ; for then these lights and the persons in the room unite in producing such quantities of this very noxious and destructive gas as very soon to render the air of the room quite unfit for respiration. There is a great mistake very frequently committed by persons as regards the manner in which they allow this gas to escape, and even by persons from whom we would be inclined to expect better.

Now I shall just explain to you what I mean in such a way, and by such an example, that you must understand it at once.

There are very few of you who have not been one time or other at what is commonly termed a party. As the night advanced, and dancing went on, you of course began to feel the room *very close* and breathing somewhat difficult ; these were the effects of the presence of Carbonic Acid

abundantly produced by the respiration of the persons present, and the burning of the candles. This is even still more insupportable if persons are collected in a wake-room: for the corpse the moment decay sets in gives out this gas in copious quantities. Some persons think, that by raising or letting down the window, they will prevent any evil consequences which might occur—but it is no such thing; as the air let in is of course much colder than that already in the room, and the result is, that persons by exposing themselves to the sudden current thus produced, receive a chill which drives back into the blood moisture that should be allowed to escape, and thus subject themselves to many diseases such as colds and fevers, which very often end in death.

Thus you see how necessary it is to have a little knowledge of these things, as it may be of the greatest service to us at some future time, and thus also you will understand how important it is that we should see, wherever we are, be it in the cell of the prison or our own humble home, that it be properly ventilated.

Colour.—The air, though it appears to us colourless, is, strictly speaking, of a bluish colour. To see this we must look through a vast quantity of it which learned men call a volume, and in the day time too, when it is lighted up as it were by the rays of the sun. Mountains far off frequently appear blue, but this is really the colour of the air between them and the observer—for all practical purposes, we may say that the air is colourless and transparent, that is, that we can see through it.

But as Carbonic Acid gas possesses such very dangerous qualities, it may be asked, would it not be a better arrangement if the common air were entirely free of it? I at once answer, no, and shall tell you why. You recollect what I said about oxygen gas a few minutes ago, and amongst

other things that it afforded to man and the lower animals the most necessary portion of their nutriment. Well then, the vegetable was to be consulted for as well as the animal, and mark now, the animal could no more exist without his supply of Oxygen than the vegetable could without Carbonic Acid—it being the natural food of every plant that springs, from the largest tree that waves in the forest to the smallest blade of grass that trembles in the breeze. There is not a single green leaf, or herb, or tree, or flower, that is not continually sucking it in through invisible pores; and thus, while securing food for itself, it is at the same time purifying to a great extent the layer or stratum of air through which we and other animals move about on the surface of this earth.

We will now glance at the part which watery vapour has to play in keeping the air in a healthy state. Every plant, I must inform you, whether it be the sturdy oak or the slender willow, solid as it may appear to the eye, is made up of water to nearly the amount of the three-fourths of its whole weight; and the leaves, which may well be called the lungs of the plant, from the likeness of the duties performed by them and these organs in animals, are constantly sending forth quantities of water in the state of invisible vapour; now, if the air were completely dry, or nearly so, it would absorb or suck out all the moisture of the plant too rapidly, in fact much faster than it could be supplied to it by the soil, through means of the roots, and the consequence would be that the plant would immediately dry and wither up, and finally cease to exist; and man's lungs would, without sufficient degree of moisture in the air, meet a similar fate. In the body of a man weighing over 150lbs., there are 38 lbs. of dry, solid matter; all the rest being water, which is continually passing out in vapour from his lungs and through his skin. Were the air quite dry, man would, as

in the case of the plant, be in a short time parched up, and nothing would remain but a dry shrivelled carcase. To the watery vapour contained in the air we are also indebted for the refreshing dews in summer, which by a law of nature are made to fall in the greatest abundance where most wanted, and which contribute so much to the health of the vegetable world when rain is for any length of time denied.

Summary.—You are now, I hope, familiar with the principal uses and properties of the substances which form the air we breathe. Of its utility as a vehicle of sound, of its agency in the diffusion or spreading about of light, and so-forth, I shall take other and frequent opportunities of speaking; but from what I have stated you cannot fail to be struck with the extraordinary wisdom, skill, and care for the comfort and preservation of his creatures manifested by our all-powerful and all-seeing Creator in this portion of his works; how well adapted each substance is for the part it is required to perform, and how many and what great advantages arise from anything that may seem to us injurious in its composition to make amends for the evil. Many of the properties of it which we are now convinced to be true, may hereafter be found to be incorrect, for in this as in every one of God's works, there are a thousand things which we are not able to explain; a thousand utilities we cannot discover, but which may hereafter come to light, and excite the wonder and admiration of future generations. Whenever, then, we turn our thoughts to the works of God, in those portions of nature that lie within our reach, let us proceed with reverence and caution, well aware that our own understanding is limited, and cannot comprehend the intentions of an all-powerful Creator; but when we do succeed in discovering how bountiful he is in his care for his creatures, let us earnestly pray to him to make us always grateful.

WATER.

Having spoken to you some few evenings ago on *air*, and having good reason to believe that you valued the information given you on that common but very important *thing*, I have resolved to introduce another *common thing* on this evening, with the name of which you are as familiar as I am myself;—it is *water*.

Utility and Weight.—There is no substance in nature more useful, if we except air, than water. It is to be met with in three different forms; namely, as a solid, *such as ice*—as a fluid, as you see it in this glass, and as vapour or steam, as you see it issuing from the pipe of a boiling kettle. It is in the state of vapour that it floats around our globe; but we are better acquainted with it in the form of a liquid, in which state, when *pure*, it may be said to be colourless, and I might say tasteless. The purer the water is the more transparent it is, and I may add the less its weight. You may remember that, in my lecture on air, when speaking of its weight, I also made some remarks upon the weight of water. You may recollect that I told you a solid or cubic foot of water weighed nearly 1000 ounces, I meant of course the water that comes under our notice every day; for it is right I should tell you that water has not the same weight in all countries or under all circumstances. Water will be found to weigh less in very warm countries than it weighs in countries with a temperature of climate such as ours, for hot water is lighter than cold, and therefore it would require a greater weight of cold than it would of warm water to fill a gallon.

The weight of an imperial gallon of cold water is 10lbs., but the weight of a gallon of boiling water will be found to be considerably less, (by the term imperial measure you

are to understand a measure fixed by the laws of the country—in other words, a legal measure).

Contraction and Expansion.—All fluids swell when heated, and contract when cooled; so that if you fill a gallon, or any other vessel, with boiling water, and allow it to cool, you will find it will sink considerably, and that a given quantity of that now in the vessel will weigh heavier than an equal bulk of it in its boiling state, for as it cools it contracts, and therefore occupies a less space. There is, however a certain degree of coldness to which if water be brought down, instead of contracting, it expands, or swells. This is a peculiarity which I shall explain to you more fully after having spoken a few words about an instrument called a Thermometer which is used to find out the temperature, or the different degrees of heat and cold of all fluids, the atmosphere included, and on this account it is sometimes called a weather-glass.

Thermometer.—The Thermometer is a very useful instrument of the simplest construction. It consists of a long tube of glass with a hollow ball or globe at the end partly filled with mercury, or what you commonly call quick-silver. In some Thermometers the tube is filled with spirits of wine, coloured so as to be seen when it rises; but this one which I hold in my hand contains mercury, as you may perceive. When the ball is filled with mercury or spirits of wine, it is placed in boiling water which you know must cause it to expand, or swell; and at the point where the fluid reaches in the tube the latter is broken off, and closed with a pair of pincers so as to prevent the least particle of air from getting out. Of course the glass tube is softened by great heat or this could not be done. The ball is then taken and plunged in what is termed a “freezing mixture;” and owing to the cold, the fluid contracts and sinks down in the tube; and where it stops the number

32° is marked; the little circle placed beside the 2, is to tell all persons looking at the number that it means 32 degrees; and the little line on the scale where it is thus marked is called the freezing point, and the line placed at that part of the tube where the fluid stopped when the ball was put in boiling water is marked 212° to show that this is the boiling point. A degree is commonly taken to mean 60 geographical miles, but the degree we now talk of means the small distance between any two of the little lines you see marked on the scale.

As I intend entering more fully into the nature of this and other instruments on another occasion, I must defer saying any more about it at present, and proceed with the subject of our discourse.

From what I have said you will see that when water is reduced to the temperature of 32° it becomes solid and this change from a liquid to a solid state is called freezing, and that is why the point marked 32° is called the freezing point, as was before observed.

Maximum Heat.—You may remember that I have just now spoken about what is termed the boiling point of the Thermometer, which is marked 212°. Now I should perhaps tell you a little more about this boiling point. You are aware that water in a kettle becomes hotter and hotter as we apply heat to it; but you are not to think that you can continue to render it hotter and hotter for ever. No you cannot, for no matter how great the heat you apply after the water has reached the boiling point, you cannot make it exceed the degree of heat already attained. It is well you should know this, for it may save you a deal of time hereafter, and perhaps a deal of firing too. If you want to know when you have made water or any fluid as hot as you can, all you have to do is to place a Thermometer in the water, and if the mercury rises to the point marked 212° the water cannot be made hotter. In

this state the water boils; and until reaching this state was of course becoming hotter and hotter while the heat was continued. I was near omitting to tell you that the heat imparted by the fire to the water is absorbed or sucked in by the steam or vapour into which the water is converted, and if the heat be prolonged, all the water in the vessel will escape in the form of vapour.

Evaporation.—It must be also remembered that in converting boiling water into vapour there is nearly six times as much heat used as would convert ice into boiling water. Water is converted into vapour at points much below the boiling point, or 212° . It is well known that vapour is produced even from ice; so you see that water may be converted into vapour at different temperatures or degrees of heat. When water boils it is converted into vapour at every point and at every depth, but at or near the bottom of the vessel more than at or nearer the surface of the water. The less heated the water, the nearer the surface will the evaporation take place, while the air immediately over and in contact with it acts like a sponge in absorbing or sucking in the vapour as it arises, and when the air is so full of the vapour that it cannot hold any more, it is said to be *saturated*, just as we say of a sponge when it is so full of water that it cannot take in any more.

It is clear from this that evaporation takes place, more or less quickly and largely, as the air is more or less able to receive or contain the vapour.

To illustrate what I say I have only to remind you of a phrase or expression which all of you must have heard used by some of the female members of your families. The phrase is, "there is no drying out to day," that is, the clothes cannot dry though exposed to the air. Now you will ask me why. Well simply, because the air is full of vapour, and like the clothes themselves it is moist. The

drier the air the more quickly will moist substances dry when exposed in it ; for the faster will the moisture escape from the pores or little holes which are always to be found even in the most solid substances. Windy days are very good for drying ; for the wind sweeps the moist air before it, and then dry air rushes in to supply its place ; and the current caused in this way goes on as long as the wind continues.

Pure and impure Water.—Water, you may remember I stated, when pure has no taste ; but pure water is not to be found on any part of the earth's surface, so to obtain pure water a regular process must be gone through. All water therefore in what we call its natural state contains particles of matter dissolved in it, and the kind of matter, of course, depends upon the sort of substances which the water flows against, or, what we sometimes say, comes in contact with. (One body is said to come in contact with another when the two meet or knock against each other.) Now you may ask me, why we do not see these things contained in the water ; but you might as well ask me why you do not see sugar after you have put it into tea or coffee, and stirred it up. Listen to me while I tell you the reason you cannot see the sugar in the tea or coffee, or whatever other liquid it may be, in which you put it. The sugar is melted and the liquid sucks it in, and is therefore said to hold it in solution ; on the very same principle does the water of a river hold various ingredients in solution, and on this same principle do the waters of the great ocean hold common salt in solution. You taste all these things when you drink the water containing them, though you cannot see them. You are not, however, to think that the different things which water contains cannot be seen ; no, there are learned men called chemists, who can take the ingre-

dients which are contained in any water out of it, and lay them before your view as clear and as distinct as the maps on the wall. And according to the nature of these substances, the water will vary or differ in its taste. Spring water, considered so good to drink, even in its purest state contains lime and other substances. Some spring water holds iron in solution, and many of you may remember seeing stones, looking somewhat like iron, about a well; this colour is given to them by the water of the well. Spring water you know is called hard water, and its hardness is owing to the things it holds in solution. The waters of some springs are altogether unfit for common use, but are used for medicinal purposes.

Filtration.—Water, as I have just told you, contains in solution many impurities which are removed by what is termed filtration or clearing, and the vessels used for the purpose are called *filterers* or clearers.

There are many kinds of filterers, all of which are very simple in their nature. Prepared paper, earthenware such as you see in coarse unglazed crockery-ware, and a peculiar kind of stone brought from a place called Teneriffe, an island in the Atlantic Ocean between Africa and America. The water in passing through these substances loses its impurities, and is then said to be filtered water, and of course much purer than it was in its original state.

Now though water, in its natural state, is not pure, we are not to think that if it were, it would contribute more to our benefit. No, for did the Creator give us pure water, instead of the kind ordinarily met with in our springs, lakes, and rivers, it would be of the greatest disadvantage to us. Pure water would not serve so well for drinking, or for cooking purposes. How insipid and unpleasant is rain water! yet, in its natural state, it is the purest water we have; but to obtain it in this state it must be received

direct from the clouds, as by passing through spouts and leaden pipes it takes up many impurities. River water may be classed next to rain water in pureness.

You may remember I stated, in a former lecture, that the ancients considered there were in nature but four simple substances, and that from a union of these in different proportions every visible object was formed, whether animal, vegetable, or mineral. Water they held to be one of these substances, the others were fire, air, and earth. Modern discoveries have shown, however, that this was a very great error, for it is now well understood that there are more, I believe, than sixty simple substances, and perhaps some of those which we now rank as simple may hereafter, as science advances, turn out to be compound substances. I should have remarked, that when a substance cannot be analyzed, that is separated into two or more distinct substances, each possessing peculiar qualities it is then called a simple substance. Now when we put water through a certain process or operation, (very easy to be understood by any one who may have an opportunity of seeing it performed by the chemical professors who are almost constantly explaining these subjects in the public lecture rooms in this city) it is found to be former of two distinct and widely different airy substances—namely, oxygen gas, with the qualities of which you are already familiar, and hydrogen gas, a term implying water-maker, of which I shall endeavour to give you as clear an idea as I can.

Hydrogen.—In the first place then I must tell you that, like the generality of gases, it has no color, and is on that account invisible, neither has it taste nor smell, but as it easily mixes with any impurity that comes in its way, it often acquires a most unpleasant odor, of which every one is sensible who has ever stood for a moment near a leaking gas-pipe, for hydrogen is a large ingredient in the ordinary

lighting-gas. In the next place it is the lightest body or substance in nature, as any given complement of it will weigh fourteen times less than the same complement of common air.

On this account it is used to fill balloons, two thousand cubic feet of it weighing only eleven pounds, while the same complement of common air will weigh 160 lbs. When confined then, and prevented from mixing with the air around, it must, according to the natural law by which fluids are regulated, rise till it comes to a region of the air where the weight of equal bulks of both are the same, and this is why a balloon can drag after it a considerable weight to a distance of several thousand feet from the earth.

Lastly, it is one of the readiest bodies in nature to catch fire and kindle into a blaze or flame; bodies possessing this quality are said to be inflammable; well, hydrogen is highly so, and when set on fire burns with a weak blue flame, but throws out an extraordinary heat.

Formation of Water.—Having now, I trust, given you a plain description of the properties of this important substance, I shall proceed to show in what proportions it unites with oxygen to form water.

This could be done by either of two means; we could procure the two gases, a flask of oxygen, say, and another of hydrogen, and by means of instruments which chemists have invented for the purpose of making experiments, fill a third with certain portions of both; then if an electric spark be applied the gases will explode and form water, and this process is termed, *composition*, which is the term used, you must remember, to express the mixing together of simple substances to form compound ones. The other method is just the opposite of this, and very simple. By the help or agency, as it is called, of electricity, a substance you all must have seen, at one time or other, under

the form of lightning, whose flashes, wild and untamable as they seem, man has now made obedient to his will, pure water can in a few minutes be converted into the two gases of which it is made up, and this operation is called *decomposition*, which you now observe is the separation of a compound substance into the different ingredients of which it is composed, or formed. Whichever of the operations—composition or decomposition—we use, it will go to establish or prove the same fact, namely, that water is made up of eight measures of hydrogen and one of oxygen—that is, in other words, every nine gallons of it contains eight gallons of the former and one of the latter; and that a given bulk of oxygen weighs exactly sixteen times as much as the same bulk of hydrogen. Now you, no doubt, remember that any lighted material placed in pure oxygen will burn with much more vigor and rapidity than in the common air; and I have just informed you that hydrogen is the most inflammable of all substances, can it then fail to raise your wonder that water, so different, so very opposite in its nature to fire, should be formed of two substances, so closely connected with, and so favourable to the production of the latter; yet this is simply the result of chemical union,—by which term you must understand such a union to take place that from two different bodies a third will be formed having no properties belonging to either, but on the contrary, new ones, quite peculiar to itself. Such is the case with respect to water, in which you see the gases are chemically united, whilst in the composition of air they are simply mixed.

Natural State.—In its natural state, water is never pure, not even rain water, but if you listen to me attentively, I shall tell you how pure water is obtained.

Water, you know, holds in solution, that is, in a dissolved or melted form, various substances; and, as the water goes

off in the state of vapour or steam, these substances remain and collect together on the sides or bottom of the vessel which contains it—you have only to look into an old kettle to see this—for there you will find yellowish matter or sediment, settled on its sides, which is nothing more or less than the remains of the impurities of the water. Now the water that escapes in the form of vapour is *pure water*, and as cold can convert this vapour into a liquid again, nothing more is required than to place a glass or some cold vessel over the steam to receive it as it escapes. In a few moments, pure water will be obtained, and in this way water is distilled and the process is called distillation. Of course, the receiver of the steam is of a very particular construction; but you can well understand the principle. The quantity of vapour necessary to form a gallon of water, is very great, being about 1,800 gallons; so you see vapour must be greatly reduced in bulk, before water can be produced. From this it is evident, that one gallon of water will produce 1,800 gallons of vapour.

Poisonous Matter contained in Water.—Before concluding my observations on this important subject, I shall say a few words on the injurious or poisonous matter which water is sometimes found to contain, and the use of which for domestic purposes, the situations where such waters are to be met with, and the remedies that are occasionally employed to purify, or render them fit for the use of man and the animals dependent on him.

In the first place, we should be cautious of using water from springs or wells, found in the neighbourhood of farm-yards or large towns. In such places you all know, filth of every kind is allowed to collect in large heaps, containing quantities of rotting remains of vegetables and animals.

Now, matter while rotting is undergoing Chemical Decomposition, a term I explained to you but a few moments ago, in which state it forms or gives out new substances,

many of them fatal to animal existence. These substances water has the power of dissolving, or melting with great ease, so that when heavy or continuous rains fall upon these collections of filth, the impurities to which I point are melted and washed out, in a very short space of time. They then spread themselves by degrees through the surrounding soil, and, at last, find their way to the springs and wells of the country, which, of course, they corrupt or poison; and such waters have very often been the means of causing deadly diseases to break out amongst the population who have no better to use.

Dangers to be guarded against.—From this you see how dangerous it is to permit refuse consisting of animal and vegetable matter to be heaped up near your wells, and how necessary it is that the water for supplying the wants of the inhabitants of large towns or cities should be conveyed from some distance from the situations where collections of this objectionable kind are permitted to be made. Wells in the neighbourhood of Burial Grounds—Church Yards, as they are often called in this country—are not less dangerous and destructive.

You must all, or at least most of you, have heard of a liquid called, “Aqua-fortis,” strong water is the meaning of the term, and a very good reason there is for giving it that name, for several hard, solid bodies, very difficult to be melted, will be speedily dissolved on being placed in a vessel of it. Now, human bodies, as well as those of the inferior animals, when in the course of decay, give out this substance in considerable quantities. It very soon unites with lime, potash, and other substances, with which the earth is commonly mixed, and should the soil happen to partake of a porous or spongy nature the new compounds soon creep through every corner of it, mix with all the streams or springs flowing by or lying within reach of their deadly in-

fluence, thereby rendering the use of the waters far more to be dreaded than that of those already mentioned. I may as well inform you here that amongst men of learning or science, which means the same thing, this powerful fluid, *Aqua-fortis*, is known by the name of *Nitric Acid*; and that, on that account, a mixture made up of it and any other simple substance, is called a "Nitrate" of that substance, for instance, if it be mixed with silver, the new substance formed is called "nitrate of silver;" if with lime, "nitrate of lime;" if with magnesia, "nitrate of magnesia," and so on, all being more or less destructive. I am now to be understood as speaking of springs and streams in the neighbourhood of Burial Grounds, which have either entirely or partially fallen into disuse; for much worse substances are to be found in waters taken from wells or rivulets close by graveyards, where numbers of dead bodies are daily interred, the first stage or commencement of decomposition being that which is most favorable to the formation of those noxious or hurtful compounds.

Unwholesome Water.—The wells or springs of vast districts in many countries are all found to supply waters of a very unwholesome kind. Where the surface of the earth partakes very much of a sandy nature, but is still capable of producing vegetation, I mean of nourishing plants, they are most commonly to be met with. The following is the manner in which persons having great experience or knowledge of such matters, explain the process which makes the waters become bad and poisonous in such situations. They say that when the vegetable substances decay and rot on the surface, the matter they give forth sinks down to some distance in the soil and forms with the sand a sort of clayey layer. You see these slates piled over each other on the table near me; when substances are arranged one above the other in that form they are said to lie in layers. Now,

though the hardest marble we know of is full of small pores or holes, this clayey layer we talk of has none, and will not, therefore, permit water to pass through it. When rain falls in any quantities then in the localities under our consideration, it sinks through the earth till it meets this layer on which it must rest, not being able to force a passage through. After some time little rills are formed which find their way under the surface of the ground to those hollows in the inside of the earth where the waters are collected from which springs or wells issue. During the time, however, the water remains on the aforesaid layer it is not idle. It is able by means of its natural properties to dissolve some of the objectional vegetable substances contained in the layer, which it, of course, carries along with it in its underground passage, thus spreading corruption and the seeds of infection over whole districts.

Boiling a means of Purification.—Sometimes by simply boiling the water, the corrupting substances can be got rid of; for being somewhat of the nature of the white of eggs, it is curdled by boiling, or by pouring in a juice found in oak and other woods, which produces the same effect. In whichever way this curdy matter is produced, by boiling or by the infusion of the oak juice, it sinks to the bottom, rolling down with it all other foreign substances, and leaving the water pure and fit for use. Thus it is that the waters of large districts in France are cleared or purified.

A peculiar description of nut reduced to powder will make the waters of some districts in India drinkable, while bitter almonds are known to have a like effect on the muddy waters of the Nile. These facts cannot fail to bring to our recollections a remarkable and at the same time interesting passage in Scripture History relative to the journey of the Israelites from Egypt, I refer to the sweetening of the waters of Marah, as we read in Exodus:—

“ So Moses brought Israel from the Red Sea ; and they went out into the wilderness of Shur ; and they went three days in the wilderness, and found no water. And when they came to Marah, they could not drink of the waters of Marah, for they were bitter : therefore the name of it was called Marah. And the people murmured against Moses, saying, what shall we drink ? And he cried unto the Lord, and the Lord shewed him a tree, which when he had cast into the waters, the waters were made sweet.”

I have now, I hope, made you understand something of the nature and composition of water, and the benefits and blessings the Great Creator had in contemplation for his creatures on the day when he gathered together the waters and called them “ Seas.” Let us never fail to take occasion to praise and thank Him in whatever shape His wisdom or goodness is presented to us in this portion of His works—whether in the fertilizing shower, the refreshing spring, the cooling brook, the glassy lake faithfully reflecting the blue heavens above it, or the tempest-maddened ocean, proclaiming through the thunders of its billows, “ I am the Lord and none else ! ”

PLANTS.

It is my intention on this evening to speak a few words to you on that division of nature, termed the Vegetable Kingdom. It may not be out of place here to tell you what is understood by the term, nature—it signifies the *work* of God, or as it has been beautifully expressed, “nature is but the name for an effect whose cause is God.” (I here explain the meaning of cause and effect and give some familiar examples of their relation.)

In every law of nature and in every effect produced, the hand of the Almighty worker is plainly visible, and the better acquainted we become with his works, the more we must admire the wisdom and power of their Author.

We are told in the Bible that on the third day, God said: “let the earth bring forth the green herb, and such as may seed, and the fruit tree yielding fruit after its kind, which may have seed in itself upon the earth.” God here gave expression to His will, and by His creative word only was all this accomplished.

It is now nearly six thousand years ago since the Creator gave utterance to the words I have just repeated, and during that time the earth has never ceased to yield the herb, or the trees to bear their fruits for the support of man and the animals over which he gave him supreme power. And were the earth to last thousands of thousands of years, the will of Him who said: “let light be,” and, “let the earth bring forth its fruits,” shall be obeyed.

In six days God made this world and all things in it; therefore we are to conclude that every living creature, from the animalcule, or little animal, that sees a world in the smallest drop of water, to man himself, and every

vegetable, from the tenderest blade of grass, or the most delicate rose-leaf, to the stateliest oak in the forest, are all the work of His hand.

Now this is true, and equally true is it that not a thing, no matter how useless, how worthless, or even injurious it may, at first sight, appear, but has been made by Providence to answer some useful purpose; and it is our ignorance of, and indifference to the works of God which prevent us from knowing these uses, and appreciating the wisdom and the benevolent intentions of the Divine Being, who has stamped on each its proper quality.

Unfortunately the whole sum of our knowledge is very limited, and we are always too ready to pass our judgment on things at first sight and to pronounce them as useless and injurious, though if we were less hasty we might see abundance of reasons to form a very different opinion. Let us then always bear in mind that though there are things in nature in some respects injurious, they more than compensate for this in the many ways in which they render service to mankind.

Extent of the vegetable kingdom.—The first point to which I will call your attention is the extent of the vegetable kingdom, as this division of nature is commonly called. About one-third of the surface of our earth is taken up under dry land; and it has been estimated that a little more than the fourth of this space is inhabited by man. This is not the case with vegetables. They occupy a much greater portion of the earth's surface, as they are to be found in luxuriant growth on the mountain top, or beneath the waters of the deep. Indeed the tribes of plants, which we are in the habit of calling sea-weeds from their seeming uselessness, but which should be properly termed "marine plants," have, in several instances, so many curious and beautiful characters that a very distinguished writer, Mary

Howit, strongly exclaims against the injustice of calling them *weeds* in the following exquisite lines :

Oh call us not weeds but flowers of the sea,
For lovely and bright and gay tinted are we ;
Our blush is as deep as the rose of the bowers,
Then call us not weeds, we are ocean's gay flowers ;
Not nursed like the plants of a summer parterre,
Whose gales are but sighs of an evening air ;
Our exquisite, fragile, and beautiful forms,
Are nursed by the ocean, and rocked by the storms.

Forests of plants, some of from 300 to 400 feet in height and of considerable thickness of stem, some so minute or small that they cannot be seen by the naked eye, occupy the bed of the ocean or world of waters throughout its whole extent. These plants differ widely from those on land in their nature and structure, but are supported and fed by the same means. There are not so many varieties of them as there are of land plants owing, perhaps, to the almost uniform temperature of the ocean at low depths, and the absence of the many causes, such as difference of soil, elevation and the like, which exercise a great influence on the growth and distribution of the latter.

Division of marine plants.—Marine plants indeed may be divided into two great classes or groups, those having joints, which are generally of a threadlike form ; and those without joints ; the last mentioned group includes, however, a good many different species. Sea-weeds fix their roots to rocks, stones, the stems of other weeds, in fact to anything coming within their reach. They are easily detached or loosened by the motion of the waters, and are sometimes found in such masses, particularly in southern latitudes, as to save ships from being wrecked by preventing them from being dashed against rocks, in the heavy swells to which these seas are subject, thus showing that

the Creator has formed nothing without some wise object, either on the land or beneath the waters.

Providence of God displayed in the distribution of plants.—Such and so varied is the extent of the vegetable kingdom; but then we are not to suppose that the Creator scattered plants about in all directions and on every side, without any order or regularity of plan in reference to clime or country—no, he assigned to each kind a particular region or country best suited to rear and bring it to perfection, and where it would be of most service to the wants of that portion of the human family dwelling there.

Structure of plants.—Let us now take a short view of the structure of plants; we will select a tree for our purpose. On looking at an oak or an elm, a person, who has never made this subject his study, would be very apt to think it a mere lifeless mass of irregularly shaped wood, putting forth green leaves in the spring season, and casting off in winter because it is its nature to do so, and nothing more. This, however, is very far from being the case. The tree is provided with means of taking in food, of digesting it, and of turning it into the substance of which it is itself formed in the same way as animals are. Fluids circulate, that is flow with regularity, through its trunk and branches just as the blood does through the veins of animals. It has a power to decompose or separate the compound substances it imbibes or sucks in—to form new compounds—to collect certain substances called by the learned “secretions,” as animals have. In fact the only reason why a tree or any other plant has not a stomach or cavity to contain a supply of food, is that it has no necessity to go in search of it like the animal, a regular supply of the simple kind required for its support being always prepared in the spot where it grows.

Now that portion of the frame or structure of an animal

by the aid of which it is enabled to perform any of the actions necessary to continue and sustain its existence, is called, in the language of naturalists, that is those who study nature, the "organ of that action;" for example, the lungs are termed the organs of breathing or respiration—the stomach, the organ of digestion—the ear, of hearing, the eye, of sight or vision, and so on; and whatever is seen in nature to be possessed of a structure the different parts of which have assigned to them the performance of different actions on which its existence depends is said to have an "organic structure."

Well it has been proved that plants do all these things I have mentioned, we must therefore admit that they have an organic structure, and a very delicate and interesting one it turns out to be too. Indeed the result of the numerous experiments by which this fact has been now firmly established appears so convincing and so satisfactory, that very many distinguished naturalists have gone so far as to adopt the opinion that plants are gifted with feeling as well as with life and an organic structure.

Effect of poisons on Plants.—Certain poisons which are known to be fatal to animal life, will, when administered to plants, effectually kill them. If a solution of any of those poisons,—that is, if any of those poisons melted or dissolved in water, be applied to the roots of a plant, it will, as might be expected, be sucked up by them gradually, that is, by little and little. Well what is the effect? Why it has no sooner spread itself through the body or stem of the plant than its leaves begin to curl and crisp, then grow limber and droop; and finally the plant withers and dies. This curling and crisping and drooping of the leaves must be admitted to be very like the twistings and convulsions we see take place in animals whose deaths are caused by poison.

Feeling of Plants.—There are plants certain parts of which being wounded by a needle or any other pointed instrument, other portions near are seen to bend and fold over the wound. Does not this look very like feeling?

Close connection of Vegetable and Animal Life.—There are plants again whose leaves are continually moving in different directions, up and down, and laterally, or side-ways, and every way, though it is impossible to observe the slightest agitation or stir in the air—this would lead us to suppose that plants have feeling. There are others whose leaves shrink from the slightest touch of the human finger. In fact so closely do plants resemble animals in the performance of many actions by which life is supported, that naturalists have found it a hard task in some cases to say whether a thing is a plant or an animal, or to mark the boundary where animal life commences, and vegetable life terminates. Plants live—they breathe—they perspire—blood, or a fluid corresponding to it, circulates within them, and their forms are covered with skin as our own are; for the bark of trees is nothing more or less. Again plants, eat and drink, and what will appear stranger still, some of them seem to require animal food for their support, as you will see by what I am about to say.

There is a plant called the pitcher plant; at the ends of the tendrils* grow little vessels in the shape or form of a pitcher with a lid at top. When the plant reaches a certain size, this lid raises of its own accord, and, at the bottom of the leafy vessel, a liquid substance is easily observed, which serves as a trap for the insects necessary for the support of the plant.

* I here tell the men that tendrils are those thread-like shoots by which the sweet pea and other climbing plants are enabled to fasten themselves to the supports up which they climb.

Another very curious instance of plants requiring animal food is that presented to us by one known by the name of Venus's Fly Trap. At the ends of the leaves of this plant are two little lobes or divisions bordered with bristles; from the ridge of each lobe rise three small bristles forming a triangle (this figure is here explained). Any insect passing over the leaf is sure to come in contact with a bristle. The moment the bristle is touched by the insect, a shock is felt by the whole plant, and the leaf closes on its unwary victim and converts it to food.

These examples cannot fail to teach you some of the wonders to be met with in the vegetable world, but had I time to dwell upon the vitality, or the principle of life, of plants, I could tell you many more things about them, still more curious and interesting.

Sleep of Plants.—The life with which plants are endowed seems to be mainly due to the light of the sun. In proof of this it is stated that they flourish more vigorously in the sunshine than in the shade, and at night actually seek repose in sleep as animals do. The family of plants bearing the closest resemblance to animals in this point is that called the leguminous, of which the common pea or bean may be mentioned as examples.

As the close of day draws on, the leaves present a rather fatigued and weary appearance. This is almost visible indeed, and the more the light of day declines, the more they bend and fold together, till at last they close entirely up, and sleep, as it were, till the return of the morning sun enables them to recover their vigour, spread out their leaves and unfold their flowers or blossoms. Indeed almost all plants sleep during the night, of which fact the leaves or blossoms afford visible proofs. This I shall illustrate by instances from plants and flowers with which you are all familiar.

You know, I am sure, every one of you the wild flower called Dandelion—this plant, let me tell you, opens its leaves early in the morning at 5 o'clock or so, and is said to close them at 9 in the evening or thereabouts. The Marigold is said to go to bed with the sun and rise with him in the morning. The "modest daisy" shuts its blossom in the evening and opens it again to meet the morning beams: and any of you who have seen a clover-field at dusk, must have observed the sleepy appearance it presents, every single leaf in it being closed up, lulled to rest as it were, which opens only with the return of morning. I think these instances are quite enough to show you that plants, like animals, are accustomed to seek repose in sleep.

Diseases of Plants—Vegetables not only present all these marks of being endowed with life, but they are also subject to diseases. One of these is called mildew. The plant attacked with this disease is seen to be covered with a white dust, which was formerly believed to be the work of insects, but is now found to be caused by the stoppage of the circulation of the juices. This stoppage of the juices is followed by a slow decomposition or corruption of the plant, in which state it attracts or draws to it millions of insects which lay their eggs on every part of its surface, forming the dusty crust called mildew. It is found that the weakest plants and trees, and such as are placed in unfavorable localities, are most liable to this distemper.

In some places a matter very much like dew, but sweet and sticky, and which is now thought to fall, like dew, from the air, frequently produces diseases in plants, of which they generally die. In certain countries this matter is seen after a night in small drops on the leaves of a whole row of trees, and sometimes in such quantities that people have imagined that showers of honey had actually fallen. By some it is supposed to be a sweating or perspiration

caused by some distemper in the inside of the tree, by which the juices are corrupted and the circulation stopped as in the case of mildew. It has been observed that the leaves on which this kind of dew falls soon become spotted and blackish and finally decay, an effect which is thought to be caused by something in its substance. As was stated respecting mildew, myriads of insects collect round trees or plants attacked in this manner, and give us another example of the goodness and wisdom of Providence in making them serviceable in removing, by turning into food, those corrupted vegetables which are become useless to man, and might be injurious to him also. Plants, like animals, have their periods of infancy, maturity or full strength, and decay, as well as their different terms of existence. Some tribes perish as soon as they have sprung up, some live only till they come to full growth, while others having obtained situations favorable to their wants and habits exist for a length of years almost beyond belief.

Longevity of Plants.—Travellers inform us that they have met in the forests of Lebanon in Palestine groups or clusters of cedars bearing marks of an age perhaps as remote or far back as the time of our blessed Lord's suffering. In other parts of the east trees have been found exhibiting proofs of having lived for terms varying from 800 to 1000 years. One authority assures us that he found in a country grave-yard a yew tree measuring sixty feet in girth, and appearing from the number of yearly growths or layers shown by its diameter—this description of trees being increased by a new circular layer of wood every year, which can be clearly and easily distinguished—to be over 2800 years old.

A French Naturalist who has bestowed a great deal of attention on the study of this subject, states that in the course of his observations of trees remarkable for their

longevity, or great age, an orange tree had been found 600 years old, a lime 1100 years old, an oak 1500 years, a yew 2500, a kind of tree called baobab 5000 years, and one of the cypress tribe called taxodium 6000 years old, which, according to the account of the creation found in the Bible, appears to be as old as the world itself. Indeed the same writer remarks that it may be looked upon as a memorial to mark the exact time when the Creator brought the world out of a state of confusion or disorder into its present form.

Having said so much on the nature of vegetable life or the vitality of plants, we will now turn our attention to the matters which constitute their food.

Food of Plants.—It is true that plants receive or draw much of their support from the earth in which they are rooted, but not so much as is supplied to them from the air by which they are surrounded. You may remember my description, in a former lecture, of a substance called Carbonic Acid gas. Well, this gas forms the chief or most important part of the nourishment of plants. You may also remember I told you that in the months of Autumn, during the decay or decomposition of fallen leaves and other vegetable matter, this gas is produced in great abundance. I do not recollect having explained to you what is meant by the process called decomposition; however, lest I have not I shall do so now.

When we say a body, be it animal or vegetable, is in a state of decomposition, we mean simply that it is rotting, in which state it begins to disappear by degrees, the original simple substances of which it was composed being resolved or separated, and invisibly mingled with air around, forming new compositions, and leaving nothing behind but dust or ashes. But though the body may have wholly or nearly disappeared from view, it has only undergone a

change of form, not a particle of matter however minute being ever destroyed or reduced to nothing. Fallen leaves, and indeed all vegetable matter when undergoing the process of decomposition, give out large quantities of pure carbon, a substance of the same nature as burned or charred wood, which uniting with the oxygen of the air forms what is called Carbonic Acid gas, which, as I before stated, supplies the vegetable world with the principal part of its nourishment. It is this gas that renders soil fruitful, the richest being that which contains most of it.

Soil.—Pure clay, you must know, is quite a different thing from the soil we cultivate; pure clay in which nothing will grow, and through which water cannot pass, being one of the simple substances mentioned in a former lecture, and soil being formed of decayed animal and vegetable matter, particularly the latter, and on that account is called vegetable mould. It is always of a dark color and found in abundance in every country.

It is to assist or hasten the decomposition of vegetable matter in the soil that digging and ploughing are employed; for, by these means, the surface is loosened and broken, and the more it is softened and crumbled, the farther and the easier the air can pass through it, but, unless the air find means of coming in contact or close union with the vegetable matter rotting under the surface of the soil, the carbon given forth under these circumstances can meet with no oxygen to mix with, and carbonic acid, that nourishment so necessary to the plant, cannot be formed.

You may remember how frequently I take occasion to impress upon you the fact that God has made nothing, however worthless or mean it may appear, without intending it for some useful purpose.

What I am about to tell you will afford a strong proof of this. I have shown you how necessary it is to break

and powder, as it were, the surface of the earth in order to provide the plant with a plentiful supply of food ; well now observe what share the common crawling earth worm, which we are accustomed to despise so much, has in this operation. I quote from high authority—" In loosening and refining the mould the common earth worm is the fellow labourer of man ; it eats earth, and after extracting the nutritious part, ejects the refuse, which is the finest soil, and may be seen lying in heaps at the mouth of its burrow. So instrumental is this creature in preparing the ground, that it is said there is not a particle of the finer vegetable mould that has not passed through the intestines of a worm ; thus the most feeble of living things is employed by Providence to accomplish the most important ends."

Is not this one fact enough of itself to call forth our wonder at the simplicity of the means employed by the Creator in rendering this world a habitation suited to such a being as man ?

It is not my intention at present to enter deeply into explanations of how the food or nourishment taken in by the plant from the air or from the earth afterwards becomes part and parcel of the plant, and how it is changed into the matter of which the wood, the leaves, the fruits, and the flowers so pleasing to the eye of man, are formed, as this would require a great deal of knowledge very hard to be acquired to enable you to fully understand, and would after all prove of no great advantage. I shall speak a few words, however, on this part on our subject.

While it is under the ground it draws its whole support from the soil, but the moment it lifts its head above the surface, the air is made to contribute its own share towards its nourishment, and the more the plant increases in size the greater the necessity for air becomes. Indeed the whole tree tribe derive all their food from the air, from the time their fruits

ripen till they begin to shed their leaves. The class of plants called *annuals*, from the circumstance of their seeds requiring to be sowed or planted every year, are fed almost solely by the air, deriving little or no nourishment from the soil. There is a tribe or family of plants called air-plants which flourish in situations where they can have no communication whatever with the ground—several of them can be seen any day in Glasnevin gardens, just at hand here, these, of course, it must be admitted live on air only.

The roots of plants are furnished with little sponge-like substances which enable them to soak and convey to the organs of the trunk the water around them; where it undergoes a regular process of decomposition by which it is resolved into the gases of which it is composed, namely, hydrogen and oxygen; the former or first of these, mingles in different quantities with the carbonic acid already in the body of the tree, and forms wood, sugar, starch, gums, vegetable oils, and acids, which are the *secretions* I referred to in a former part of the lecture; whilst the latter, that is the oxygen, enters into and becomes a part of the composition of the leaves, and also assists in the formation of resins, oils and acids. That a plant, nay the same identical plant, should contain all these different substances may appear very strange, it is nevertheless true; they are not all formed, however, at the same time, but at different stages of the plant's growth, the starch being converted into sugar in proportion as the fruit ripens, the fruit also being sweeter in proportion to the quantity of starch contained in the plant. The ripening of the fruit it must be observed depends a good deal on the clearness of the sky, and the temperature of the air.

From what I have now told you, it can be easily seen that the food of plants consists chiefly of the gases generated or formed by the union of a few simple substances with the

matters composing the common air, and of water; but it cannot fail to call forth our astonishment and admiration that objects like plants, apparently destitute of anything approaching to an organic structure, should on close examination be found possessed of a machinery so wonderful and so powerful as to be capable of turning into food materials so simple, and forming from them so many varied and valuable substances! There are other things which contribute to the food of plants, but to so slight an extent that to mention them would only help to perplex your minds and encumber my lecture.

The odour of plants.—The perfume, or sweet scent yielded by the rose and other fragrant plants of the flowering tribe, is owing to an oil which they secrete of a highly volatile nature. The term volatile, signifies apt or eager to fly away, and a volatile oil, is therefore, one which, of its own accord, flies away in vapour through the air. This vapour is invisible, and consists of drops of nature's perfumed oil, so exceedingly small, that a grain of the finest dust has magnitude or size in comparison to one of them. Such small divisions or portions of matter are called particles, and it is these particles striking in their flight against the organs of the nose—the most delicate in the human structure—which produce the sense or feeling of smell. The pleasure which man derives both from the perfume and the beauty of flowers, the first being so agreeable to his sense of smell, and the last to his sense of sight or vision—is said to be the chief object of our bountiful and benevolent Creator, in calling them into existence. This class of plants, is known by the name of odoriferous, which means, perfume-bearing. These plants give out more of their perfumes during the morning and evening, than at other periods of the day, and spread or diffuse it further in warm than in cold countries. Along some portions of the coast of Arabia, a large district of the

division of the world called Asia, the perfume of the flowers is said to be perceptible, that is, capable of being felt, for miles out at sea.

Distribution of plants.—We now come to the distribution of plants, that is, the placing of them in their proper places, and their adaptation or fitness to the places in which we find them placed, or, in other words, of which they are natives. The number of species or kinds of plants has been set down by Naturalists at something between 70,000 and 100,000. This you will say is a surprising number, but it will appear still more surprising when I tell you, that of this very great collection, there is not a single kind or species which has not its own particular country, and special position in that country, where the soil and climate are best fitted to its structure and wants, and the plant itself to the wants of the inhabitants. Some are formed to flourish in those burning tracts, which you see on the map of the world before you here at each side of the equator; the line or circle, which, as you have been often told, divides the northern from the southern half of the world. These are called tropical countries, and it is in these countries that vegetables attain, or reach to, the greatest dimensions or size. Some have a structure so hardy, that they are able to grow beneath the never-thawing snows of the polar regions—that is, Lapland, and those other countries which we see on the map there situated round the north pole. These regions are situated in what is called the Frigid Zone, and it is here that vegetables dwindle down almost to nothingness. Some love to spread their leaves over mountain heights, where human foot-step has never yet left a print; and some choose their home in the sheltered valleys which the brightness and variety of their colors help so much to beautify; but of all this, I may say, boundless collection, there is not one species, I repeat, which does not seek to occupy the particular spot allotted to it by

God at the commencement of the creation. It would be quite as impossible to make some of these plants change climates with others, without doing them injury (unless we make a suitable change of temperature, or heat of atmosphere) as to make fishes leave their natural element, water, and soar, like birds, through the air.

What I have told you here about the number of species or kinds of plants on the surface of the earth, of their fitness for the countries in which they are found growing, and of their organic structure and mode of taking in and digesting food, is, no doubt, very wonderful, very curious, but not more wonderful and curious than is the skill and wisdom displayed in their nice distribution over the various climates of the earth. The limits of this lecture will not permit me to give you many instances of this adaptation or fitness ; I shall, therefore, only point out a few of those which cannot fail to strike even a careless observer.

Thus in the tropical countries, the situation of which I have a moment ago pointed out to you on the map, where the heat of the sun is so great that the least degree of labor is hardly bearable, we find a tree producing an article of food in its fruit ready made and without requiring an hour of man's labor, and so nearly resembling, when roasted, our fresh bread, in preparing which we spend so much time and trouble, that it has been significantly called the bread-fruit tree. The fruit is described as being about the size of the head of a newly born infant, and so wholesome and nutritious that Captain Cook states, if a man plant but two in his whole life time, he will discharge his duty to society, as faithfully and as fully as the natives of other countries do by a life of continuous or unceasing labor. In these countries too, where coolness and shade appear to be among the greatest of man's natural wants, we find the banian-tree with its many trunks, under whose broad spreading branches a small army might repose without inconvenience ; the fan

palm, and others with leaves so large, and of such a shape as to resemble a good sized umbrella, and actually answer all the purposes of that article. In our own regions, where labor is useful to keep the human frame in a healthy state or condition, we find the broad fields of wheat and other grain which supply us with the chief part of the staff of life. Advancing further into the cold northern climes, we will be sure to miss fruitful crops, and plentiful herbage; but instead we meet with the lichen, a kind of plant formed to thrive under the snow, which there almost always covers the ground, and is of greater value to the natives than any other plant could be. It is this plant that supplies food to the rein-deer, a creature which in those climates answers all the purposes of the horse, and the other tame animals with us, and in fact makes those dismal regions habitable, where:—

“Tardy suns to deserts drear,

Give days and nights of half a year.”

I shall only add two more examples of the fitness of plants for the countries they are placed in, too wonderful to be omitted; and these are the pitcher plant of the southern islands of Asia, and the cow tree of America:—

“The curious vessels found attached to the extremities of the pitcher-plant form so many little urns, containing a clear, wholesome, and well-tasted water. In the morning the lid is closed, but it opens during the day, when a portion of the water evaporates: this, however, is replenished in the night; and each morning the vessel is full, and the lid shut. As this plant grows in sultry climates, and is found in the island of Java in the most stony and arid (parched up with heat) situations, how welcome and exhilarating must the sight of it often be to the weary traveller; and from the marks of teeth upon the vessel, it has been said ‘that, it is evident that beasts often supply their wants at the same plenteous source.’ The milk-tree,

or cow-tree, so called on account of the resemblance its singular juice bears to the milk of animals, in the place of which M. Humboldt has seen it used for every domestic purpose, and is thus described by that enterprising traveller:—"I confess that among the great number of curious phenomena which I have observed in the course of my travels, there are few which have made a stronger impression on my mind than the cow-tree. On the barren declivities of a rock grows a tree, whose leaves are dry and coriaceous (leather like); its thick ligneous (woody) roots scarcely enter the rock; for several months in the year, rain scarcely waters its fan-shaped leaves; the branches appear dry and dead; but, when an incision (cut) is made in the trunk, a sweet and nutritious milk flows from it. It is at the rising of the sun that the vegetable liquid runs most abundantly; then the natives and negroes are seen to come from all parts, provided with vessels to receive the milk, which becomes yellow and thickens at the surface. Some empty their vessels under the same tree; others carry them home to their children. It is like a shepherd distributing to his family the milk of his flock. If those who possess these precious trees near their habitation, drink with so much pleasure their beneficent (kind and bountiful) juice, with what delight will the traveller, who penetrates these mountains, appease with it his hunger and thirst?"

So much for the order and regularity in which we find the several kinds of plants forming the "vegetable kingdom," spread out on the face of the earth, and the fitness of each for the spot allotted to it. We come now to their uses of which we will only mention a few, as to do justice to this part of our subject would require a whole lecture, and the present has, I fear, already gone beyond the proper limits.

To the plant in the first place, man is indebted for that most necessary of all kinds of food—bread. To the tea and coffee-plant he owes much of the most palatable of all beverages or drinks. The number of delightful fruits yielded by the fruit-bearing tribes, scattered over all parts of the world is almost too great to be counted. From the cotton-shrub comes a large share of his clothing. The plant gives the spice that makes our food savory; to the Chinese it supplies candles, to the natives of Chili in South America salt. In one part of the world it gives a medicine to expel from the body the wasting fever, in another a balsam to heal our wounds. There are many more important uses of the plant, upon which I cannot now dwell; let it be enough to say that from the plant may be formed the house that shelters man from the severity of the weather; from the plant is formed most of the furniture on which our ease and our comfort depend; and from the plant is constructed the huge ship by which the most distant countries can be, as it were, brought together, their natural productions exchanged, and the bounty of nature spread equally amongst all God's creatures.

I trust that you can now comprehend or understand some of the wonders of the vegetable kingdom, and that I have not in vain attempted to point out to you the great wisdom and skill, the great love and affection for His creatures the Lord has shown in this part of His works; but above all let me hope, that His love and affection will fill your hearts with gratitude and admiration, and His skill and His wisdom give you a higher notion of His greatness, and His power; that you will think more frequently of Him, and that you will earnestly pray for His grace to overcome your vicious dispositions.

J. P. O.

CANADA AND HER RESOURCES.

Canada was first discovered, in the year 1499, by Sebastian Cabot, and after being frequently visited by the French, was colonized by them in 1608. This lively and intelligent nation saw in it the making of a great and productive colony. They encouraged emigration to it, they endowed its church, and according as civilization spread, divided it into lordships, or baronies, as we call them. Some of those lordships still exist, with their grand old French names. The accomplished and brave French gentleman, in after generations, intermarrying with the sensible, solid, Saxon Englishwoman, and *vice versa*, the sturdy, honest English yeoman uniting himself with the educated and graceful French dame, have produced a race of people at this moment inhabiting Canada, that for politeness, hospitality, and good nature, in every sense of the word, is scarcely to be excelled by any in existence. In 1759, it fell into the occupation of the English, and has remained in their possession up to this moment. It would be out of place here to enter into a history of the events that led to the rupture with France, and consequent war, in the course of which this interesting country was wrested from the crown of that country; so I shall content myself with referring merely to its last great battle—that of Quebec. The battle of Quebec was fought, between the French and English, in September, 1759, on the heights of Abraham, which overhang the city. In this decisive and sanguinary engagement both generals were killed—the heroic General Wolfe, on our side, and the Marquess of Montcalm, on that of the French. Our general, Wolfe, was much lamented by the nation and the army, as he was a good man as well as a brave general. It may be well to repeat the epitaph

inscribed on his monument by direction of the British Parliament:—"The Parliament erected this Monument to the Memory of Major-General James Wolfe, who, having distinguished himself eminently in Europe and North America, by a stretch of magnanimity, gained a master victory at Quebec, September 13th, 1759, and fixed upon the spot, in death, the fulness of his fame." This is, indeed, a glorious tribute, and richly he deserved it. In 1791 Canada was divided into two provinces, the Upper and Lower: and every year since it has advanced with gigantic strides in the path of prosperity and contentment. When the English took possession of the province they respected the ancient laws and rights of the colonists: private privileges were secured, and the church of the people acknowledged and protected. It is right to remind you, the old Canadians were of French origin, and, consequently, professors of the national faith of the mother country, and had an endowed church and hierarchy of their own, just as we have here at home, which institutions were left in full and undisturbed integrity by their new masters.

At the present day it may be asserted, that amongst the numerous and flourishing colonies of Great Britain there is not to be found one more flourishing, and certainly more content, than that of Canada. Its countless resources are hourly developing themselves; its population increasing in wealth, civilization, and refinement. No man with health, and willing to work, can be without a dollar in his pocket; and if he be sober and industrious, ere long without dollars in the bank too; and, as a matter of course, farms, flocks, herds, corn, and cattle follow. Plenty of work, and ample reward for that work, awaits the Canadian immigrant: it is there, indeed, "reward sweetens labour," and man can find a true aim for his activity. The tall tree invites the axe of the clearer; the limpid stream, wandering through sweet

and untrodden meadows, woos the eye to rest with pleasure on it, and make thereon a happy home. O, men, contemplate the happiness of those who are sufficiently fortunate to secure a home in this favoured land. Past troubles only enhance the pleasure of present joys. Brothers follow them in the path of industry they have shown them; sisters seek shelter from the storms of a cold world with them; and blest, thrice blest is the man who can boast to himself that he has created a warm chimney-nook for his aged parents beyond the Atlantic wave. Acre after acre, is added to the farm yearly; the axe sounds cheerily in the light of the morning and evening sun; the tall tree falls with a merry shout from the strong and well-fed woodman. Well may he shout: the fall of that tree adds another rood to his farm—estate I should say—as the price of one of our pigs, our small pigs, would pay the rent of 100 acres. The knowledge, partial as it is, which you receive here of tailoring, shoemaking, &c., would make you invaluable assistants to some of those large Canadian farmers, as when the day's work would be done, you could, by the bright wood fire, ply your trade, and thereby fill your pocket. The proprietors invariably treat their servants—assistants they consider them—with kindness; they remember that they took axe and spade in hand, some short time before, themselves, and that the path is open to you to do so likewise, and attain the same honourable independence.

Though my object is not so much to make you acquainted with the natural geography of the country as to point out to you the inducements it holds forth as a field for employment, yet I cannot allow to pass unnoticed the great natural beauties and inexhaustible resources of native wealth of this favoured country of lakes and rivers. I must, therefore, ask your attention while I glance hurriedly at these subjects as I go along.

Geographical Features.—Canada extends from Labrador, on the East, to the Western extremity of Lake Superior, on the West, a distance of nearly 1,600 miles, with an average breadth of 220 miles. Its area is said to be 350,000 square miles, or three times greater than that of Great Britain and Ireland.

By looking at the map you will see that the large Gulf of St. Lawrence and Labrador, form its Eastern boundary; other British possessions extending to the great Pacific Ocean, its Western; the territories of the Hudson's Bay Company, its Northern; and the United States and New Brunswick, its Southern.

The colony consists of two divisions, namely, Upper and Lower Canada. The former is sometimes known as Western Canada, and the latter as Eastern Canada.

Upper or Western Canada contains about 100,000 square miles, and Lower or Eastern Canada about 206,000 square miles, or more than double the area of the upper province. I do not now include the vast space occupied by the channel of the great river St. Lawrence, and part of the gulf of the same name, which by some is computed at a quarter of a million square miles.

The contents or areas that I mention here you are not to consider as precisely exact, for geographers very seldom agree on these points. For instance, I find it stated on a different authority that the area of the whole of Canada, that is, the two divisions, upper and lower, taken together, comprises 346,863 square miles. Be the area of the colony what it may, it is sufficient for us to know that it is nearly three times greater than that of Great Britain and Ireland, as I have already mentioned.

Canada is one of the finest watered and best wooded countries in the world; her timber forms one of the most important items in her exports, several ships being annually laden with it to these kingdoms.

I have just stated that Canada is finely watered. Her rivers and her lakes are amongst the grandest in the world.

The St. Lawrence stands at the head of the rivers in Canada. It takes its rise West of Lake Superior, under the name of the St. Louis, and is known by various names as it flows along. Thus, between Lakes Superior and Huron it receives the name of the Narrows, or Falls of St. Marie; between Lakes Huron and St. Clair, the St. Clair; between Erie and St. Clair, the Detroit; and between Ontario and Erie, the Niagara. It is not known as the St. Lawrence till it reaches Montreal, from whence it runs direct into the ocean, into which it is said to discharge every year 4,300,000 tons of fresh water. The estuary, or mouth of this river is 100 miles wide; its basin is said to embrace nearly 298,000 square miles, of which 94,000 are covered with water. The length of this noble river from its source to its mouth is about 3,000 miles, varying in breadth from one to ninety miles.

The scenery along the river St. Lawrence is beautifully grand, and is thus described by one, long familiar with its characteristic features :—

“The river St. Lawrence, and the whole country, unfold scenery, the magnificence of which, in combination with the most delightful physical beauty, is unequalled in America and perhaps in the world. From both land and water there are frequently prospects which open a view of from fifty to 100 miles of river, from ten to twenty miles in breadth. The imposing features of these vast landscapes consist of lofty mountains, wide valleys, bold headlands, luxuriant forests, cultivated fields, pretty villages and settlements, some of them stretching up along the mountains; fertile islands, with neat white cottages and rich pastures, and well-tended flocks; rocky islets and tributary rivers, some rolling over precipices, and one of them, the ‘Saguenay,’ like an inland mountain lake, bursting through a perpendicular chasm in the granite chain; while

on the bosom of the St. Lawrence, majestic ships, large brigs and schooners, with innumerable pilot boats and river craft charm the mind of the immigrant or traveller."

The scenery on approaching Quebec is truly magnificent. "On the left, Point Levi, with its romantic church and cottages; on the right, the western shore of the Ile d'Orleans, said to resemble so much the Devonshire coast; beyond, the lofty mainland opens to view, and the spectator's attention is riveted by the magnificent Falls of Montmorency, a river as large as the Thames at Richmond, and which precipitates its volume of waters over a perpendicular precipice 220 feet in height. The eye then runs along a richly cultivated country for miles, terminating in a ridge of mountains, with the city and battlements of Quebec rising amphitheatrically, creating, as it were, the ridge of Cape Diamond, and majestically towering over the surrounding country as if destined to be the capital of an empire—the whole panorama being one of the most striking views in the old or new world."

Justly may the Canadian people be proud of their noble river, and look upon it as the grand highway of their commerce. Though parts of this river are occasionally interrupted by rapids, some of which are so great as to prevent vessels ascending them, yet the enterprise and energy of the Canadians have overcome the danger and difficulty here presented by means of a chain of grand canals, which renders the St. Lawrence navigable for vessels of great burden for nearly its whole course.

The canals constituting this magnificent chain are the Wellend, St. Lawrence, and Lachone canals, which are only rivalled by that which travellers regard as the greatest monument of Chinese industry.*

* CANALS.—Mr. Hogan, in his admirable essay, referring to these canals, remarks that—"As early as 1841, when the population of

The principal rivers that flow into the St. Lawrence are the Ottawa, St. Maurice, and Saguenay, on each of which I shall make a few remarks in their turn.

The Ottawa river is next in size and importance to the St. Lawrence. Its length is about 780 miles, and in its course receives as tributaries many rivers which are equal in size to the largest in England. The country drained by this river abounds in natural wealth, perhaps more so than any other part of the mighty continent of America.

The basin of the Ottawa extends over an area of 80,000

Upper Canada was but 465,357, and of United Canada only 1,114,837, and when their entire annual revenue did not exceed £347,000, their Legislature had the courage to make an appropriation of half a million pounds for these works. As a consequence, locks among the finest and largest in the world have been constructed, and divide admiration with the splendid river they render more available for the use of all America. The passenger, as he returns by the canals, finds it indeed difficult to tell which to admire more, the works which have been the offspring of enterprise and intellect, or the St. Lawrence river. The chambers of these locks are two hundred feet long by a width of forty-five feet, and they are so superbly constructed that they will stand for ages as monuments to the spirited little Legislature which conceived and secured their completion. The remaining link of canal—for I may as well speak of it in this connexion—between the Gulf of St. Lawrence and the head of Lake Superior, is the Welland which unites Lakes Erie and Ontario, and avoids the Falls of Niagara. Its locks are little less capacious than those on the St. Lawrence canals, but are equally well built. They have chambers a hundred and fifty feet long by twenty-six and a-half feet wide, and the available depth of water in both is between nine and ten feet.

“The contemplation of these canals as works of enterprise and skill, naturally leads to their contemplation as works of utility and enlarged public value. If the people who now occupy the vast valley of the St. Lawrence, and the plains and slopes which are less conveniently situated to other great channels of communication to the ocean than to it, were to use it solely, would they be acting wisely and well? Or if the tens of thousands from Europe who annually seek this valley and these plains and slopes, with the view of occupying them, were to follow up this chain of navigation, would they be doing the best they could for themselves? These inquiries are of singular interest, and I shall devote all the space to them that the limits of this essay, and the other important matters treated of, permit.”

square miles, which is said to be capable of supporting 8,000,000 of people.

The scenery along the Ottawa is so magnificent that no words can adequately describe it.

The country is represented as offering the greatest inducements to all classes of industrial and enterprising immigrants—a truth of which fresh proofs are every day afforded. Lord Elgin, alluding to the vast advantages of this portion of the colony, in his despatch to the Government, about four years ago, says “that the farmer who undertakes to cultivate unreclaimed land in new countries, often finds that not only does every step of advance which he makes in the wilderness, by removing him from the centres of trade and civilization, enhance the cost of all he has to purchase, but that, moreover, it diminishes the value of what he has to sell. It is not so, however, with the farmer who follows in the wake of the lumberman: he finds, on the contrary, in the wants of the latter, a real demand for all that he produces, at a price not only equal to that procurable in the ordinary marts, but increased by the cost of transport from them to the scene of the lumbering operations.”

In closing my remarks on the Ottawa river, I should perhaps tell you that the natural wealth of the country through which it flows comprises an inexhaustible supply of iron, vast quantities of timber, (in fact, the forests here are, perhaps, the finest in the world), copper, lead, plumbago, marble, &c.

This district furnishes annually to the European markets alone 25,000,000 cubic feet of timber, 850,000 deals and planks, with a vast variety of other timber.

I now close my remarks on the Ottawa river with the following extract from the Report of the Government Agent to the Crown Lands Department relative to the wealth of the district:—

“On principles of calculation admitted by persons of experience to be correct, after making deduction for barren ground and destruction by fire, it is estimated that there are still standing on the Ottawa and its tributaries, about 45,811,200 tons of timber, of the kind and average dimension now taken to market, and about 183,244,800 tons of a smaller size, though still valuable.

The river St. Maurice drains a large and valuable tract of country also, which within a few years has had its sources of wealth developed by men of perseverance and enterprise. Several companies have been formed and are engaged in the timber trade, and Government has expended large sums of money in the construction of rafts for conveying timber down the river.

Along the banks of this river are extensive fields of iron ore, and many extensive iron works.

The Saguenay, 200 miles distant from the St. Maurice, is a beautiful river, and of great depth. The scenery of its banks is perhaps not exceeded in beauty and sublimity in any part of America. Many of the rocks on its shores attain the height of 3,000 feet.

Many large manufactures are to be found on this river, and numerous ships laden with timber, destined for Great Britain.

I have given you a brief account of the principal rivers in Canada; very brief indeed, but the time just now does not permit me to dwell any longer upon this point of our lecture. Of course you can understand that in such a country as Canada very many rivers exist, which I have not noticed now, but in a future lecture they shall engage our attention.

The Lakes of Canada come next under our notice. They are very many, but I shall only tell you about a few of the principal ones, and these are lakes Superior, Huron, Erie, and Ontario.

These lakes form a grand chain, and are all situated on the river St. Lawrence.

Lake Superior, as its name denotes, is superior to all other fresh-water lakes in the world. Indeed it may justly be termed an inland sea.

This queen of lakes covers an area of 32,000 square miles. Its length is 430 miles, breadth 160 miles; depth 1,200 feet, and circumference 1,750 miles; it is said to receive the waters of nearly 200 rivers. It contains a great number of islands, and its shores are rocky, but for the most part covered with timber.

Its waters are discharged into lake Huron by a part of the St. Lawrence, known as the River St. Mary.

Lake Huron is another vast sheet of water, 250 miles long, 220 miles broad, and about 900 feet deep. A line drawn round the lake would measure 1,100 miles. This lake receives the waters of many rivers, and contains good harbours on its north coast. The River St. Clair connects the lake with Lake Erie, which may be termed the third great lake in Canada.

This lake runs from east to west, and is 280 miles long, sixty-three broad, and covers an area of 11,000 square miles.

It is bordered by a most fertile tract of country, which renders it of much commercial importance. That part of the St. Lawrence known as the River Niagara, connects this lake with Lake Ontario. On this river are situated the Falls of Niagara, which I shall speak of by-and-by.

Ontario is 180 miles long, eighty broad, and having a circumference of 7,000 miles. The scenery of this lake is truly beautiful, and many harbours, deep and capacious, are to be found round its coasts. Like the other lakes, it receives the water of many rivers, amongst which is that of the St.

Lawrence, which flows from it in one uninterrupted course of 700 miles to the great Atlantic Ocean.

All the lakes that I have mentioned are raised one above the other, and many rapids and waterfalls are thus caused on those parts of the St. Lawrence which connect them. The following will give you some idea of the position of these lakes.

Lake Superior is raised 672 feet above the level of the sea; Lake Huron is thirty feet lower than Lake Superior; Lake Erie is thirty-two feet lower than the Huron; and Lake Ontario is 331 feet lower than Lake Erie. These two last-mentioned lakes I have already told you are united by the River Niagara which is thirty-three miles long, and slants or descends sixty-six feet in this short distance.

The Falls of Niagara, which I mentioned a while ago, are situated between Lakes Erie and Ontario.

This cataract presents the most magnificent scene perhaps in the world; the perpendicular height of the fall being about 150 feet, with a breadth of 3,500 feet, or about three-fourths of a mile. From the weight of this vast body of water, and the quickness of its descent, the ground in the neighbourhood is always trembling, whilst its roar is heard on every side for a distance of fifteen or twenty miles.

I have now given you some information about some of the chief of the grand lakes of Canada, or rather of America. A description of all would be impossible to embrace in the limits of a lecture; but I would wish you to remember this remarkable fact, that the American lakes contain more than half the quantity of fresh water in the world.

You must be satisfied with this brief sketch of the lakes and rivers of Canada at present, and give me your attention while I speak of other things which, if not so interesting, are equally important to know. I shall begin with its *natural productions*.

Natural Productions.—*Timber.*—The value of timber exported from Canada in 1853, amounted to £2,355,255; and the ships built in Quebec during that year may be estimated at £620,187. Of the timber exports the value of the quantity, according to Mr. Hogan, sent to Great Britain amounted to £1,682,125; to the British Colonies £11,000; and to the United States of America £652,544.

The consumption of timber for home purposes during the same year might be computed at least to £2,000,000. We may, therefore, set down the proceeds of the forests for 1853 at £4,532,000.

Canada possesses all kinds of ornamental timber; and one kind called the black walnut is superior in durability and grain to the mahogany and rosewood used in Europe.

Pot and Pearl Ashes.—The value of these articles exported in the same year amounted to £157,000.

Furs and Skins.—The value of furs and skins exported in the same year is estimated at £32,000.

Fisheries.—The fisheries of Canada contribute very largely to her wealth.

The produce of this trade in 1853 was about 110,000 barrels; and the value of the fish exported £85,000, viz:—to the United States, £18,355; to British North American Colonies, £15,072; to Great Britain, £8,801; to foreign colonies, £42,770.

The following is an extract from a paper prepared by Mr. Bouchette, and published by the House of Assembly in 1852:—

“ Rushing periodically in certain seasons from the Atlantic, whether by the passage of Canso or by the entrance to the gulf, between Cape Ray and Cape Lawrence, the cod, herring, haddock, mackarel, and the various gregarious finny tribes, in immense shoals, spread along the vast extent of coast that is presented by the gulf shores of Cape Breton,

Nova Scotia, New Brunswick, Gaspé, the north coast of the St. Lawrence, and Labrador, to the Straits of Belle Isle ; then along the western coast of Newfoundland to Cape Ray, presenting upwards of 2,000 miles of in-shore fisheries, besides the numerous rivers and streams which are ascended for miles by salmon, as well as a quantity of fresh-water fish, which forms a very productive branch of the fisheries of these provinces."

Mineral Wealth.—Canada abounds in mineral wealth ; gold, silver, iron, copper, have been found in various places throughout the colony ; and the development of these sources of wealth only await the energy and enterprise of men of capital to give employment to thousands, and thus show to the world that nature has been bountiful in her gifts of these metals, as well as in the other treasures of which I have already spoken,

Agricultural Produce.—As an agricultural country Canada offers inducements of the most favourable kind to the farmer and agricultural labourer. In 1852 the exports of agricultural produce amounted to £1,274,214 3s. 10d., while in the succeeding year it increased to nearly £2,000,000.

Canada is a very extensive wheat-growing country. In 1851 the produce was considerably above 15,000,000 bushels, of which upwards of 4,230,000 bushels were exported.

Soil.—The soil of Canada is, generally speaking, extremely fertile, being improved and enriched in many places by the ashes of fires which sometimes occur in the forest, and thus acting as manure for the land for many years.

Mr. Morris, in his Prize Essay on Canada, tells us that —“The soil of Canada is adapted and the climate favourable for the growth of wheat, peas, rye, barley, oats, buckwheat, hay, hemp, and flax, grass seed, Indian corn, and

potatoes; and of all these large quantities are raised. Upper Canada is best adapted for wheat, and produces it most largely; but Lower Canada grows no inconsiderable quantity, and produces also large quantities of peas, oats, and the coarser grains generally. Its soil is also well adapted for the growth of root crops, which should be more extensively grown, in view of the importance of fodder, which is rendered more valuable in consequence of the length of the winter. Flax and hemp might also be grown with great advantage to the country. Lower Canada is especially suited for their growth; and these articles might prove a great source of industrial wealth, and give employment to a thrifty population. Hemp and flax grow with the greatest luxuriance."

Climate.—The climate of Canada is healthy and salubrious, perhaps more so than that of any of the United States. Much, no doubt, has been said of the severity of its winters; but facts and figures go clearly to prove that the climate of Canada is every day becoming more and more salubrious, and more favourable to health and long life.

In 1851 there were in Lower Canada over 100 years of age, 38 persons; between 90 and 100 years, 417; between 80 and 90, 3,030; between 70 and 80, 11,084; between 60 and 70, 24,095.

In Upper Canada, in the same year, there were over 100 years of age, 20 persons; between 70 and 80, 7,156; between 60 and 70, 20,266; so that the balance is in favour of the lower province, as regards the longevity of its inhabitants, and, doubtless, to be referred to the greater comparative dryness of the atmosphere.

"In Lower Canada, it may be further stated, that melons ripen freely in the open air; plums and pears grow abundantly, and apples attain a peculiar degree of excellence, the apples of the Island of Montreal being especially famed.

Peaches and grapes also ripen freely with the aid only of Glass. On the whole, it may be safely asserted that while the province presents great diversities of climate, yet the general character of its climate is such as to conduce both to the maintenance of the physical health of the inhabitants of the province, and also to the promotion of the growth of the cereal and other natural products of the fertile soil of Canada.

“The salubrity of the province is sufficiently proved by its cloudless skies, its elastic air, and almost entire absence of fogs. The lightness of the atmosphere has a most invigorating effect upon the spirits. The winter frosts are severe and steady, and the summer suns are hot, and bring on vegetation with wonderful rapidity. It is true that the spring of Canada differs much from the spring of many parts of Europe; but, after her long winter, the crops start up as if by magic, and reconcile her inhabitants to the loss of that which elsewhere is often the sweetest season of the year. If, however, Canada has but a short spring, she can boast of an autumn deliciously mild, and often lingering on with its ‘Indian summer’ and golden sunsets, until the month of December.”

Manufactures.—As a manufacturing country, Canada may be said to be only in its infancy. Many of her manufactured articles, however, obtained prizes at the great Exhibition of London in the year 1851.

Ship-building, especially at Quebec, forms the most important of her trades. The vessels built there having obtained a reputation for their speed, solidity, and beauty of outline.

In the year 1853 forty-eight ships, with a tonnage of 49,000, were built at Quebec, valued at £500,000; being an increase in one year of twenty-two ships, at a value of £340,000.

The average annual value of vessels built at Quebec is estimated at £500,000.

Iron.—Many mines of this valuable mineral are now being worked; and, from the accounts received both of the quantity and quality of this metal to be found in Canada, we may safely conclude that in a few years it will form one of the most important sources of wealth in the colony. The bar iron manufactured in Canada is equal to the best Swedish Iron, while some of the iron found in the vicinity of Lake Superior has been pronounced superior to any in the world.

Woollen Goods and Furs.—Canada produces a large quantity of woollen goods, and of a most superior quality, for which their manufacturers have received various prizes. For her furs, Canada stands unrivalled in the world.

Canada has her tanneries, her founderies, her mills, her breweries, and her innumerable factories of all descriptions, which, added to her fertile valleys, her luxuriant forests, and her unrivalled water-power, invite the labourer and the capitalist to her shores, rich in beauty, abounding in natural wealth, happy homes, and hospitable people.

Commerce.—The commerce of Canada has increased wonderfully within the last few years. The increase in her commerce from 1852 to 1853 alone was upwards of £5,000,000.

In the latter year the exports of the country amounted to nearly £6,000,000.

The exports were as follows:—produce of the mines, £27,339 3s. 2d.; produce of the sea, £85,000 13s. 8d.; produce of the forests, £2,335,255 2s. 2d.; animals and their produce, £342,631 7s.; vegetable food, £1,995,094 15s. 9d.; other agricultural products, £26,618 17s. 11d.; manufactures, £35,106 9s.; other articles, £15,823 11s. 3d.

I have told you that the progress made by Canada in her commerce was astonishing—so perfectly so, indeed, that we

should be scarcely inclined to believe it had we not proofs which bid defiance to doubt or contradiction.

The merchants of Canada are up and doing, as are all her people; and, when we remember that at the close of the last century, or thereabouts, what is now the fertile, wealthy, and prosperous Canada, was one vast unsightly wilderness, we must admit that the energy and enterprise displayed by that people give them a claim to a superior rank on the American continent.

I will now speak a few words on the chief towns of the colony in which we are all so deeply interested; and in doing so I shall now and then allude to their rapid rise and almost incredible progress.

Principal Towns.—As I have, perhaps, spoken too long already, I shall confine my observations to four of the principal towns,—Toronto and Kingston in Upper Canada, and Quebec and Montreal in Lower.

Toronto, the capital of Upper Canada, is a very handsome town, and beautifully situated on the northern border of Lake Ontario. It was the seat of parliament of Upper Canada until both Canadas were united by Act of Parliament in 1841.

Toronto, in 1826, had not 2,000 inhabitants, while its population at this moment is upwards of 30,000. It has risen with great rapidity; its progress, social and commercial, show an enterprising and intellectual people. The surrounding district is very fertile, and mansion-houses and richly cultivated farms add to the beauty as well as indicate the wealth and comfort of its inhabitants. In ten years the population of this town increased upwards of 16,000.

Kingston is a considerable town, situated on Lake Ontario, just at the efflux of the St. Lawrence, close to a number of islands. The population of this town is upwards of 10,000. Its inhabitants are most industrious and well

behaved, and the prosperity of the town is advancing every day, as may be judged from the fact, that in ten years its population has increased 5,000.

In 1793 it consisted of but one Indian's hut, containing twelve families.

Ottawa is another rising city, called after, and situated on the beautiful river of that name.

As a proof of the progress of this city, it may be stated that, in 1830, it consisted of 140 houses, some of which were mere sheds. The population of the city at present is upwards of 10,000; and, though the property on which the city stands was purchased for £80, I am sure that some of it is worth at the present time £20 a-foot.

Quebec, the capital of Lower Canada, is situated on the St. Lawrence, in a rich and fertile district; its population is about 40,000, chiefly descendants from the French.

Its fortifications, its great port, and its very favourable situation for commerce, render it one of the most imposing and beautiful cities in any of the British colonies.

This city has nearly doubled its population within the last thirty years.

Montreal was formerly the second city in Lower Canada, but is now of greater importance than Quebec, it being the seat of government. Its population is considerably above 40,000, consisting of English and French in nearly equal numbers.

The Catholic cathedral in this city is, perhaps, the most stately and magnificent building in the whole continent of America.

Montreal has trebled its population in thirty-four years, and, if not the most substantial, is certainly the most beautifully built city in America.

Banks.—Banks were established at a very early period in Canada, and have extended their operations with the growth

of the country; and though the number of them has greatly increased, still the business of banking has been so honestly and so prudently managed that there never yet has been known an instance of a Canadian bank stopping payment. Does not this speak forcibly for the healthy tone and state of society, and the unmistakable progress of the colony? Contrast this state of affairs with the banking proceedings of the United States. Why, men, there is scarcely a bank in the United States that has not broken down. A man in the United States might go to bed in the possession of wealth, and rise a beggar in the morning—his favourite bank had stopped payment, and its chief gone “over the border.” In Canada there is no boasting. In this department all is certainty, solidity, and honesty.

As a whole, the banks of Canada have been judiciously managed, and afford to the capitalist safe and favourable investment.

The Press.—The Press of the colony is also in a most flourishing and healthy state, decidedly moral, and for efficiency, general information, and character, quite equal, and, in fact, in many cases superior to the provincial press of our own country. In every ordinary sized town of Upper Canada, and in all the cities of Lower Canada, there is a press and a newspaper—perhaps two. The city sheets, that is, the returns of the imports and exports shipping published in every seaport, &c., contain, in addition to commercial intelligence, much interesting literature, and matter of importance and utility.

Ability, energy, and liberality are the leading features of the Canadian press, and its growth has been both steady and rapid.

The first newspaper was established by Mr. Brown, of Philadelphia, in 1763, “The Quebec Gazette,” which still exists.

The number of French and English papers published in Upper Canada in 1853 was forty-three, which afforded a paper for every 20,000 inhabitants; in Lower Canada, 114 papers in 1854, that is one for every 8,000. The disparity between the two provinces is gradually diminishing, and it is to be hoped will soon altogether disappear, owing to the general diffusion of education throughout the lower province. None of the newspapers in either province is confined exclusively to political topics; most of them contain useful selections and general information in various branches of literature and science; and it is pleasing to observe, that, as far as is known, they all breathe a tone favourable to public morality. Would to God we could say as much for our own periodical press.

Educational Institutions.—On the whole, Canada has every reason to be proud of her educational institutions; and their bearing on her future is a very important consideration, inasmuch as, no doubt, they must greatly tend to her advancement and progress in general enlightenment. Her system is a noble one, inferior to none pursued in other countries; superior to that of many; scarcely yielding, in fact, to the National education in Ireland.

The schools and educational institutions of Canada are built on a most superior plan; and I may assert, without exaggeration, that the system of education now established in that country far exceeds in comprehensive details anything of the kind in Great Britain. The school-houses are generally supplied with maps, standard school books, and other necessary educational requirements. In these schools—rarely not more than a mile and a-half from the most remote of the settlers in the district—the children receive a sound and useful English education, quite adequate to all the ordinary avocations of life. In some districts the schools are free—that is, they are open to all children between the

ages of five and sixteen without charge; but in the greater proportion, a tuition fee of a quarter of a dollar, that is, a shilling a month, is charged, and this is the highest amount allowed by law to be levied. A large proportion of the teachers of the common schools in Upper Canada are trained at the normal schools at Toronto, in which city there is a great university, or college, also, like our Trinity College. Under existing laws, the child of the poorest labourer, who distinguishes himself as a successful competitor for a free scholarship in a common school, has the advantage of attending one of the county grammar schools (that is, a school of higher pretension than the schools I have been speaking of). Here, again, he has open to him another free scholarship in the highest educational institutions in the country, if his merits entitle him to that distinction. Thus an educational ladder has been erected by the Government by which the child of the humblest inhabitant may ascend to the highest point of scholastic eminence, with the children of the wealthiest and most respectable in his neighbourhood as his competitors.

Thus you see, men, in this happy land, the industrious, honest man may live to see his child an ornament to the church, the law, or the medical profession, and thereby elevate himself and his other children to a height in the social scale he never could even dream of at home. It is with heartfelt pleasure I mark in every one of you, without exception, a desire to learn and make amends by every means in your power for the wofully misspent time of your early years.

Now, need I ask you, would it be the fondest wish of your hearts to see your children (if blessed with any) receive a sound, religious education, and be saved by it from the fatal errors into which you have unhappily fallen.

The government of this province, which is aptly called

“the brightest jewel in the British crown,” is of the paternal and liberal kind; in fact, there is no country on earth, even our own, where the local legislature takes more care of the people generally, and diffuses the greater good to a greater number. The charitable institutions founded on true philanthropy extend their blessings to all around. The hospitals, well endowed, and presided over by able and well-chosen officers, are a model for older states.

Postal System.—The postal system is as well organised as our own. Public libraries adorn every township. Railways intersect the country to a vast extent, and others are being constructed. At the close of last year, 1856, Canada had 2,000 miles of fully-equipped railway, which cost her about £18,000,000 sterling. What a powerful impetus this network of railroads will give to the development of the boundless resources of this country. In this little lecture I have endeavoured to advert to all matters most likely to awaken your attention, to stimulate your energies, and guide your thoughts towards this glorious and happy land.

It would be useless to encumber this lecture with minute details, as it would distract your minds from the main point of my discourse. I have attempted to describe the country, its soil, its climate, and its resources; to trace its people's advancement, to show how they govern themselves, and what are their institutions; to exhibit, in short, what may guide industry in search of a place wherein to reap the richest rewards, and capital in quest of a field for profitable investment.

“To the poor who are struggling against becoming poorer;” to those whose own circumstances place them beyond reach of want, but regard with anxiety the future condition of their younger dependents; to the “hewers of wood and drawers of water,” into whose dreams a hope of domestic comfort or independence never dared to enter,

what a prospect does this noble country hold out! Here a million and a-half of men as poor and as friendless as yourselves, have been able to fling away the weight of poverty from their limbs, and here is ample room for millions more to emulate their example.

I have endeavoured to give some idea of the wealth of this country, and though by no means capable in the limits of a lecture to do the subject the justice it deserves, still I flatter myself the picture must appear tempting. Let me now ask, who were the men who created, who now enjoy this vast property? Were they conquerors? Were they capitalists? Were they supported by powerful princes? No, on the contrary, they were the oppressed and hopeless of the old continent of Europe, with no other wealth than stalworth arms, no support but the confidence that ever accompanies perseverance and industry. Let you who listen but resolve to imitate the industry, enterprise, and the laudable ambition which distinguish the present inhabitants, and which contributed so signally to the success of the early settlers of this country; and rest assured that, if Canada has wealth, Canada will afford you every opportunity, every facility to honestly acquire your share of it. Yes, seek this shore; be steady, be virtuous, be honest; and I feel convinced that I by no means prophesy falsely if I say, that a day may come when, your former errors no longer remembered, you may stand erect before your fellow-man, happy in your home in this world, and happy in the hope of an eternal one in the world to come.

THE OCEAN.

The subject which I shall bring before your notice this evening is—THE OCEAN. Beautifully has it been styled the Symbol of Eternity—unbeginning, unfathomable, and boundless—

Beautiful, sublime, and glorious,
Mild, majestic, foaming, free;
Over time itself, victorious:
Image of eternity!

We find it written in the Bible that God said: "Let the waters that are under the heaven be gathered together into one place;" and this being done at his bidding, he called the gathering of the waters seas.

Now these same seas have in them many mysteries; the very pebbles along their shores affording subjects for study to the wisest and most learned of men.

Where is the man who, standing by the seaside, and casting his eyes over the vast ocean before him, will not be impressed with a sense of his own nothingness, and struck with awe at the grandeur, the majesty, and the omnipotence of the Creator.

Extent.—The Ocean is said to cover three-fourths of our world. Its waters are unequally distributed over the earth, as you may perceive by looking at the map of the world, now before you. In the southern hemisphere the quantity of water is much greater than that in the northern. So much so indeed that it was long suspected that a continent or large division of land lay about the south pole, in order to regularly balance the globe—a supposition which late discoveries have proved to be actually true. From 1838 up to 1841, discoveries of this continent continued to be made by the Americans, the French, and the English.

The Americans have, it appears, made a survey of the coast for a distance of 1,700 miles. It is stated to lie about 2,000 miles south of Australia, and is described as being cold and barren, covered with everlasting ice, and without inhabitants. The most southern point yet reached is a volcano, or burning mountain, over 12,000 feet high, to which Captain Ross has given the name of Mount Erebus, that being the title of one of the vessels under his command. But supposing no such continent existed, and that it were possible to remove the waters of the ocean from both the hemispheres in question, and then weigh them, it is probable the difference in weight might not be so great as it is now imagined. I am not now speaking positively, remember, but only stating what is very likely to be the real case. To understand me you must not think, as some people do, that the bed of the ocean is as level and as even as the strand on which you have all, perhaps, from time to time walked.

Bed of the Ocean.—The bed of the Ocean is nothing more or less than land covered with water, in which we find as many inequalities, hills and hollows, mountains and valleys, as we see on the surface of the land on which we move. If the water were drawn away and the bottom of the great deep uncovered to our view, we would then see at once the great resemblance between it and the dry land. In fact the bed of the ocean, that is the land under the waters, has the same, or very nearly the same, features of surface and soil as the land above it. There you find the swamp, the barren waste, the broad plain, and fruitful valley, swarming with animal and vegetable life.

Climate.—“The sea has its climates as well as the land. They both change with the latitude, but one varies with the elevation above, the other with the depression below the sea level. The climates in each are regulated by circula-

tion, but the regulators are, on the one hand, winds, on the other, currents."

"The inhabitants of the ocean are as much the creatures of climate as are those of the dry land, for the same Almighty hand which decked the lily and cares for the sparrow, fashioned also the pearl, and feeds the great whale, and adapted each to the physical conditions by which His Providence has surrounded it. Whether of the land or the sea, the inhabitants are all His creatures, subjects of His laws, and agents in His economy. The sea, therefore, we may safely infer, has its offices and duties to perform; so may we infer, have its currents, and so too its inhabitants; consequently, he who undertakes to study its phenomena must cease to regard it as a waste of waters. He must look upon it as a part of that exquisite machinery by which the harmonies of nature are preserved—and then he will begin to perceive the developments of order, and the evidences of design; these make it a most beautiful and interesting subject for contemplation."

As I shall come to speak of all these things in due course, I shall for the present confine my remarks to the area or space taken up by the several great bodies of water into which the whole ocean is naturally divided. They are the Pacific—the Atlantic—the Indian—the Northern or Arctic—and the Southern or Antarctic Oceans.

The Pacific Ocean.—The Pacific, or, as it is sometimes called, the Great Ocean, covers a space of nearly fifty millions of square miles, which, according to the best authorities, that is, persons well acquainted with the subject, is an extent of surface greater than all the dry land on the face of the globe taken together. This great body of water lies between the continents of Asia and America, and has, in some places, a breadth of between fifteen and sixteen thousand miles. This ocean is studded or spotted with more islands than any

of the others, some formed by the labours of the little creatures known as coral-worms, and some by earthquakes, and the matter thrown out from the bosoms of volcanos, or burning mountains; for these dreadful occurrences, you must know, are not confined to land,—their effects visibly disturb the waters of the oceans and seas far and wide. The depth of parts of the Pacific is indeed unknown, all attempts to ascertain it having failed, though trials have been made with sounding lines of five miles in length. But we are not to think that, on this account, the ocean is bottomless, for the greatest depth of it yet arrived at, is as nothing compared with the distance of the centre of the earth from its surface.

The Atlantic.—The Atlantic is about half the size of the Pacific, its area being about 25 millions of square miles; and, if we include the Gulf of Mexico, it will measure in breadth something about 5000 miles, which is nearly one-third the breadth of the latter. The bed of the Atlantic is supposed to be a long deep valley, lying between the Old and New Worlds; and, if we may judge from the almost total absence of islands, we may conclude, but very few mountains rise from its bed—*islands being nothing more than the tops of mountains appearing above the surface of the ocean.* The depth of this ocean also is, in many parts, very great, it being not less than six miles north of the Bermudas, while, some hundreds of miles west of the island of St. Helena, a line 27,600 feet in length did not reach the bottom—and this, you remember, is the measure of the highest mountain in the world.

The Indian Ocean.—The body of water which laves or washes the southern coasts of Asia, is called the Indian Ocean, and covers a space or surface of about 20,000 square miles.

Arctic and Antarctic.—The Arctic Ocean is that which lies

around the northern pole or extremity of the earth, and the Antarctic that which lies around the southern pole or extremity, which you see to be directly opposite points.

Depth of the Ocean.—From what I have stated regarding the depth of the ocean, you are not to suppose it to be so very great in all parts. If it were, you would be quite right in thinking its bed to be one great unbroken level, but you know this would be contrary to what I have already told you, regarding it. You yourselves have seen the bottom of the sea through a few inches of water, and are aware that it becomes deeper and deeper for awhile, and then again shallower and shallower, as you approach or come near some high or lofty spot in its bed,—an island for instance. In the tract of water lying, as you may see between Great Britain and Norway, known as the North Sea, or German Ocean, the depth throughout the greater portion of it does not exceed 93 feet. The only other remark I shall make on this point is, that where you see the coast bold and high, the sea at its bottom will be generally deep, but where the coast slants, the bottom of the sea will slant also.

In the ocean I have just mentioned, we have a strong proof of this, for along the coast of Norway where it is bold and steep, that is perpendicular, or nearly so, the depth is upwards of 1000 feet.

Pressure.—In my lecture on water, you may remember I told you something about its pressure, and the way in which it is proved to press equally in all directions. I shall not, therefore, allude to it here further than to say that the waters of the ocean, where, lightest, are found to press with a weight of 2809 lbs. on every square inch of surface at a depth of $1\frac{1}{4}$ miles.

The depth of water through which we can see depends entirely on its transparency, or clearness. The clearer it is, the greater the distance to which the rays or beams of the

sun can pierce. In the Arctic Ocean and amongst many of the West Indian Islands the water is very clear, so much so that the bottom of the sea can be distinctly seen at a depth of 80 fathoms.

Color of the Ocean.—The next thing we shall consider regarding the ocean is its color, which is not, by any means, uniform, or the same throughout, presenting different hues in different places, though at the same time, the waters of the clearest stream are not more transparent than those of the ocean. You know transparent means letting light pass through. Every gleam of sunshine, every passing cloud, causes more or less change on its surface; but its general, and perhaps true, color when not altered by circumstances, is bluish, which becomes clearer and clearer as it comes near the coasts. The variety of hues or colors which the ocean is seen to take arises from many causes. One of the supposed causes is the vast multitudes of animalcules or infusoria (animals or insects so small as to be invisible to the naked eye) with which the sea swarms, and which have the power of tinting or coloring its waters. Sea-vegetables may be looked on as another cause, as also the mineral matter which is dissolved or melted in many places by the action of the waves. In the Gulf of Guinea the color of the ocean is white; round the Maldivé Islands, west of Ceylon, it is black; off the coast of California, west of North America, and at the mouth of the La Plata, a large river of South America, it appears of a vermillion or bright reddish tint, whilst in the Persian Gulf, between Persia and Arabia, it is green. The waters of the Arctic Ocean change their colour very rapidly, being seen to be sometimes clear, sometimes dark, and sometimes an olive green. This last change is thought to arise from the multitudes of infusoria, before spoken of, that abound there, which by the way, are said to devour, or eat up each other, and then become food in

their turn for other animals. The color of the clear, shallow water is principally caused by that of the bed beneath. If that should consist of chalk or white sand, the water will seem of an apple green—if of yellow sand, it will appear dark green; if the bottom be dark, the water will be of a brown or blackish tint, while over mud it will appear grey.

I have now told you something about the size, depth, and color of the Ocean; I shall now direct your notice to another of its qualities, namely, its saltness.

Saltness of the Ocean.—The saltness of the sea saves it from corruption, or from becoming rotten, in the same manner as the process of salting saves animal flesh; it also makes it heavier, bulk for bulk, than fresh water, for the more saline or salty matter it contains, the weightier it becomes. You are not to suppose that the saltness of the Ocean is uniform, that is, the same in all places, as there are many causes of its being increased and lessened in different places. The waters of the Atlantic are found to contain more salt than those of the Pacific, and the waters of the Northern less than those of the Southern latitudes; neither is it unusual for the waters of the same Ocean to differ in respect to this quality. The Northern or Frozen Ocean is less salt than any sea or other ocean of the world, owing to the vast quantities of ice melted in these regions, and to the fact that lighter substances always float on the surface; fresh water, you know, is much lighter than salt, and, therefore, must necessarily float above it. You may easily see from this that the saltness of these seas varies or alters with the seasons; you can also understand that the surface will be less salt than the parts near the bottom in those seas or latitudes where heavy and continuous falls of rain occur. At the mouths or estuaries of large rivers, that is where they meet or end in the sea, or Ocean, there is less salt present than elsewhere, owing to vast quantities of fresh water flowing in at these points.

Where the Amazon discharges or empties itself into the Atlantic, the waters of that Ocean are found to be brackish, that is, half fresh, half salt, some hundreds of miles distant from the mouth or estuary of that mighty river. It may be easily seen now why the waters of deep seas are found to be impregnated, thoroughly mixed, I mean, with more salt than those of shallow seas, and the waters of seas which receive many rivers, with less than the waters of those which receive none.

Evaporation.—In the seas of warm latitudes a great evaporation is constantly going on, as is seen in the case of the Mediterranean, which, though receiving a vast quantity of fresh water from many considerable rivers, still preserves its saltness unaltered. This will also account for the quick disappearance of the fresh water from the surface, where it would otherwise be found floating on account of its greater lightness; for you will remember that I stated, the deeper we go, the saltier, and for that reason the heavier, will we find the water, in proof of which I need only say that, at the Straits of Gibraltar, a measure filled with water at depth of 4,000 feet, was found to be four times the weight of the same measure filled at the surface. The waters of rivers are frozen or turned into ice much sooner than those of the sea—a property or quality due also to its saltness.

Causes of saltness.—I shall now tell you the different reasons which have been brought forward to account for this saltness. It is thought by some writers on the subject that large beds or mines of salt lie at the bottom of the ocean, which give it the taste or quality we speak of; others say that the ocean has received all its salt from the rivers which flow into it; these latter dissolving and carrying along with them all the salty particles they meet with in their course to the sea, where, being finally deposited, they remain, as salt cannot be evaporated; whilst others, with

perhaps the greatest approach to probability, say that the Creator himself stamped this quality on the rolling wave the day he parted it from the dry land, and the earth ceased to be any longer "without form and void."

Be the cause or causes what they may, the saltness of the sea affords another striking proof of the goodness of God in the wonderful provisions he has everywhere made for the preservation of his creatures; for had he not endowed or gifted the deep with this useful quality, and caused its waters to mingle throughout its various depths by tides and currents, it would in a very short time yield to rottenness and corruption, and render our beautiful world one huge sepulchre or grave.

Tides.—The next thing relating to the Ocean to which I shall direct your attention, is that regular swell of its waters which takes place every twelve hours. This rising up or swelling of the waters is called the tide, and is caused by the united action of the sun and moon, but that of the moon is the principal cause, it being within 240,000 miles of the earth, while the sun is removed to a distance of 95,000,000.

Causes of Tides.—To explain the causes of the tides to men like you, whose understandings have not been strengthened and cleared by the benefit of early education, may prove a difficult task, though the subject seems now to be pretty well understood; however, I shall endeavour to be as intelligible and as plain as I possibly can. I trust you will try to follow me as I proceed, or go on, and if anything I say should not appear sufficiently clear to any of you, I request you will not allow it to pass without asking me for an explanation, which I will give you with the utmost cheerfulness, well aware that the more you know of the simplicity and grandeur of the works of your Creator, the more you will hesitate to offend Him. But to proceed. You all know from what you learned from my lecture on the earth,

that this globe we live on is continually spinning round, or turning on a line called its axis, (or axletree, if you will,) and that it makes one complete revolution in every twenty-four hours—that is, if any spot on its surface, (we will suppose London,) be now opposite a certain fixed star, or point in the heavens, it will take twenty-four hours, all but a few minutes, for London to come opposite the same point again. The motion I give the little globe I hold in my hand, will give you a notion of what I mean—it is now said to revolve.

For the present let the larger of these two globes represent the earth, and the smaller the moon; we place a bit of white paper then on the larger, and say that point so marked is Dublin Bay for instance; this, if you pay attention, will be a great help to your understanding. Let one of you take the smaller globe in your hand, and hold it stationary, and observe, as I make the larger one revolve on its axis, how often in each complete revolution the bit of white paper comes opposite the smaller one, or what is the same, how often in twenty-four hours Dublin Bay comes opposite the moon, and you will find it does so only once.

You will be surprised to hear that the moon has the power of drawing towards it not only the water on the face of the earth, but even the great bulk of the earth itself. Now when Dublin Bay comes directly opposite the moon, the waters in it are drawn or attracted, as is more frequently said, towards the moon; in other words, they swell out, and this is the tide. But there is another tide at the very same moment at the point exactly opposite Dublin Bay on the other side of the globe, marked with a bit of red paper, which you see is entirely turned away from the moon, and on which the latter can therefore use no power of attraction. This appears to puzzle you, but if you attend closely to what I am about

to say, the puzzle will vanish. I told you the moon had the power of attracting substances towards it, a power possessed by all bodies of matter in proportion to their bulk.

The effect of this attraction is felt most by air-like substances, next by fluids, and least by solid bodies; that is, the particles composing solid bodies are harder to be separated and made to increase the bulk of an object than any other. Now when the white bit of paper comes opposite the globe representing the moon at that point, as before stated, the waters are drawn a little in the direction of it, while the waters at the spot marked by the red paper are not acted upon at all, but remain as if held or pinned tight by some strong power; but the moon pulls not alone the waters on the side of the globe turned towards itself; it pulls even the great mass of the earth in the same direction, by which the depth of waters at the spot marked with the red are made to increase, just as an Indian rubber string, with one end fastened to the desk, would stretch when the other would be pulled. Thus you see how two tides are caused at opposite sides of our earth at the same moment. I have accounted for one of the tides that takes place daily in Dublin Bay; I shall now explain the cause of the other. I showed that the earth makes one revolution in twenty-four hours, it must therefore make half one in twelve, that is the white bit of paper being now exactly opposite the moon, will in the space of twelve hours come round as you may observe, to the spot where you see the red paper, in which position I need scarcely say it must have another tide, and now I hope I have satisfactorily accounted to you for the flow and the ebb of the tide twice in the twenty-four hours.

I stated the sun had some share in the cause of this motion of the ocean, it is indeed but little, and only observable at certain times, namely, when all three, the sun, moon and earth are in the same straight line, which is

always the case at new and full moon, for then the two first act together and cause spring or high tides; at the other changes of the moon, that is, the quarters, they act separately, when we have what are called the neap or lowest tides.

Tides, as I have just said, commonly happen twice every twenty-four hours, but I should not omit telling you that the circumstance of a place, such as its position with respect to other places, its shape and the like, have a great share in preventing, altering and producing tides. In some parts of the world there is but one tide, while in others there are as many as four in the twenty-four hours. Tides in various places differ very much in height too, for the reason just given; they rise to a very great height, 40 or 50 feet I should say, on the eastern coast of North America; on the coast of England they are much higher than out in the ocean, while the general height of the tides in the Atlantic Ocean between them does not exceed 12 feet. In wide open and deep seas the height is still less; in fact in places where the sun and moon only act upon the waters, the tides are never so high as those where local circumstances contribute to elevate the waters of the deep. At the island of St Helena the tides seldom exceed three feet, and among many of the islands in the Pacific Ocean the tides are scarcely perceptible.

From what I have stated respecting tides, their nature and their causes are somewhat better understood by you now than when I commenced my lecture.

Many of you perhaps never before knew anything about them more than they came and went. You know now that twice in the day the big ocean ebbs and flows. The sea swells as it were gradually, until it has attained its greatest height—it then begins to decrease, which lasts

about six hours—this is called the ebbing of the tide. At the end of six hours it again begins to flow, and so on, alternately ebbing and flowing. I should here observe that when the waters of the sea have reached their greatest height on any shore they rest themselves, as it were, for about twelve minutes before they retire—at this time it is said to be High Water. When the waters retire from our coast, and finding they can go no further, they again rest themselves for the same time, and this is called Low Water.

This motion of the sea is called its ebbing and flowing, and sometimes its flux and reflux, and constitutes the tides. It may be well that you should know, that owing to some little change in the ebbing and flowing of the sea, the tide of each succeeding day is later than that of the preceding one; nor do they return at the same time to the same coast for a period of Thirty days.

I have endeavoured to give you some idea of the causes of the tides, of course a very poor one, for their theory is not very simple, and would require men of greater learning than you are to understand its full explanation. You all understand what is meant by “low water,” but perhaps you have never considered the beauties of the ocean, disclosed to us at the time of low water. Were the waters of the sea to remain at all times heaped up, we never could have known the beauties and wonders of the Ocean so much as we do, for its bed would be always covered and hidden from our view. We should have never known that the deep has its butterflies, or that its worms wear coronets of crimson, “glittering in burnished brightness.” We should have never been able to explore its gardens, or admire the gorgeous colours of the flowers with which they abound—we should have never been aware that on its bed vegetate “an herbage of red and purple hue, exhibiting strange yet exquisite forms, such as no terrestrial vegetation displays.

Roseate shrubs of jointed stone, and arborets of filmy glass, and creatures full of active energetic life, whose forms are stranger still, both in structure and in appearance: mere worms whose colours are gorgeous as the tints of the butterfly's wing, or the peacock's tail, or the humming bird's breast."

Truly may it be said that the Ocean has its mysteries and its beauties. If "The Heavens declare the glory of God, and the firmament showeth his handiwork," does not the Ocean display His admirable wisdom, for in it "He has established monuments of His grandeur and the sceptre of His Glory." How beautiful the sentiment, and how simple, yet sublime, the eloquence of the Royal Psalmist, King David—"They that go down to the sea in ships, and have their business on the great waters, they see the works of the Lord, and His wonders in the deep."

The Ocean has its rocks and mountains, its earthquakes and volcanoes, its wells and running streams, its forests and flower gardens, its atmosphere and climates, its fertile valleys and barren wastes—in fine, the land we live on, and the sea we gaze upon are mighty like each other in their peculiarities. It is surprising that we should be so very indifferent to the works of the Creator which come under our notice day after day. There is not a pool of water along the sea coast in which we may not behold ocean gardens and sea forests on a small scale. Gardens where flowers are clothed in the most beautiful hues vieing with the brilliant and many-coloured Rainbow.

Earth has not a plain
So boundless or so beautiful as thine.

Advantages of the Tides.—The advantages arising from the tides are many. The beds of rivers affected by them become deeper, and the current down the river is checked;

these two things combined are of the greatest service to large vessels having to convey their cargo to towns removed from the sea. Were this not the case, large ships would find much difficulty in sailing up rivers against their natural course, and hence many large cities and towns situated on the banks of rivers removed from the sea, would be deprived of that abundance and variety of commodities which they have now at so reasonable a cost. It is the poor that benefit most by the tides in this respect, for the rich could purchase everything they might require, having the means to do so, while the poor would be debarred the little luxuries of life which they now enjoy. If we couple this with the great fact, that the tides by causing the ocean continually to roll, and thus preventing it from stagnation, we cannot close our eyes to the great advantages which we derive from the tides. And here let me add, that from the ebbing and flowing of the waters of the deep, any thoughtful mind may learn a lesson of the uncertainty and ever-changing nature of this world. Everything here below is always fluctuating; never resting, always unsteady and uncertain—no joy lasts long—no happiness remains, the gayest moments soon depart, and when sorrow comes we feel the miseries of existence and are sad.

“ Oh thou who driest the mourner’s tear,
How dark this world would be,
If when deceived and wounded here,
We could not turn to thee.”

I have now endeavored to explain to you the causes of the tides, and to point out to you their great utility and the many boons they confer upon mankind. Let me now direct your attention to the waves and currents of the ocean.

Besides the ebbing and flowing of the sea, caused by the

tides, its rise and fall are also shown by waves that give to the sea a motion which appears never to come to a stand. You are to bear in mind that this motion is rather in the waves themselves, than in the sea over which they roll, for the sea, though it rises and falls, is in itself stationary.

Force and Pressure of Waves.—The force of waves is exceedingly great during heavy gales of wind. Their pressure is very great also. On the west coast of Scotland their pressure has been found to be 611 pounds on every square foot of the surface during the summer months; and in winter it has been estimated at three times that amount. During storms the pressure of the waves is still greater, it having been known to reach upwards of 6,000 lbs. on every square foot. That this enormous pressure is owing to the velocity or speed of the waves, there can be no doubt; since a wave not in motion only presses with a weight equal to half a ton on the same extent of surface. As an instance of the great power exerted by waves, I may mention that blocks, varying from ten to fifty tons, have been moved to a considerable distance by it in several parts of the ocean. Notwithstanding the great force of waves, or the heavy gales that ruffle the deep so much in storms and tempests, their influence extends to a very inconsiderable distance beneath the surface of the ocean. Amidst the greatest fury of the tempest, the agitation of the waves is, we might say, confined to its surface. All is quiet beneath, at the depth of 200 or 300 feet at the farthest. Here again we see another wise provision of the great Author of Nature, for if the fury of the tempest was felt equally all through, the waters beneath would become thick and muddy, and the shell-fish, which contribute so much to our store of food, would be destroyed. The functions or offices the waves have to fill are effected, and that is all required of them; but did their influence reach to the bed of the ocean, instead of being of service in mixing its

waters and contributing their aid to prevent them from becoming corrupt as they do now, they would prove very injurious for they would deprive us of many of the treasures of the ocean, which some of the poorest of us at present enjoy. The waters of the ocean are also disturbed by currents which depend upon many causes. Some of these currents are lasting, and some are periodical, or take place at certain periods. Currents are sometimes confined to the surface of the sea, and at other times they take place beneath it. With the exception of the tides, and those currents produced by the wind, all currents may be said to be caused by the difference between the weight of the ocean at different parts of it. That the water of the ocean varies in weight there cannot be the least doubt, and this difference is produced either by a difference in the warmth of the waters, or in their saltness. The heavier or more salt water, going towards the lighter or less salt, and the lighter water going to fill up the place of the heavier. In this way the waters of the ocean are mixed together as in a bottle. In the ocean there are always to be found currents running in opposite directions, and whenever one current is found taking off water, another current is found bringing an equal quantity to supply its place. This giving and taking, so to speak, is for ever going on; for if it did not how could the first current get its water, as after a short time the place which supplied it would be dry?

I cannot think to go into the details of, or to enumerate all, the currents of the ocean, but there is one at least which I shall notice here. It is the great equatorial current, better known as the Gulf stream.

Gulf Stream.—The Gulf stream originates in the Gulf of Mexico, which may be said to be its fountain, and whence it has derived its name. The great equatorial current is first felt in the Atlantic Ocean between the tropics, near the coast of Africa, and as soon as it reaches the

eastern projection of South America, it divides itself into two streams; one, flowing along the coast of Brazil, passes into the Pacific Ocean through the Straits of Magellan; the other flows to the north-west, and enters the Carribean Sea. It then passes into the Gulf of Mexico through the strait formed by the western extremity of Cuba and the peninsula of Yucatan; here it follows the bending of the coast from Vera Cruz to the mouth of the Rio-del-Norte; thence to the mouth of the Mississippi, and along the coast of Florida. After flowing, as here described, this great current rushes out through the Gulf or Strait of Florida with greater rapidity than that of any known river, and having a volume of waters thousands of times greater than the great Amazon itself. This rapidity is owing, of course, to the reaction produced by the water striking against the coasts on the Gulf of Mexico, and the narrowness of the Channel by which it escapes. The velocity or speed of the *Gulf stream* (for it is by this name we must know this great current now), in issuing from the Gulf of Mexico is five miles an hour, and the greatest velocity, seventy-eight miles a day. After passing through the Bahama channel, it turns north-east, and flows along the coast of the United States, diminishing in speed till it strikes against the southern banks of Newfoundland. As it flows along the coast of Carolina and Georgia at the rate of about three miles an hour, its waters are of an indigo blue; indeed so distinctly marked are the waters of the stream as they pass the coast of Carolina (though a distance of seventy miles from the coast), they may be seen by the naked eye; and it is stated that frequently one half of a vessel is seen floating in the waters of this stream, while the other half is in the common water of the sea. So you see there is, as it were, an unwillingness on the part of the waters of the Gulf stream to mingle with the common water of the sea.

The eminent American writer, Dr. Murray, compares this great current to a stream of oil in the ocean, preserving a distinctive character for more than 3000 miles. Why the waters of the Gulf Stream assume the blue color which I have just mentioned may be gathered from the following well-known fact. The saltier the sea water becomes, the deeper is the color of its blue. To salt manufacturers this fact is well known; for they judge of the quantity of salt held in solution in sea water by its color. The bluer the water the more it abounds in saline matter; while the greener the color, the fresher the water. And hence we find in Polar seas the water presents a green appearance, owing to the large quantities of ice melted in it. Now the waters of the Gulf stream being saltier than the sea water through which they flow easily accounts for the beautiful blue color of the stream, or I should rather say, the majestic marine river, for such the Gulf stream is. When the stream reaches the southern coast of Newfoundland, it changes its course to the east-south-east about as far as the Azores, where turning almost directly to the south, it flows along the coasts of Europe and Africa in the direction of the Canaries, till on reaching the parallel of Cape Blanco, it completes its grand tour in the Atlantic. Here it meets the great current from which it sprung, and mingling its waters with it sets out again on its journey after making a circuit of 3,800 miles. Such is the Gulf Stream in the Atlantic.

In the Pacific Ocean the current moves with great regularity from the western coast of America to the eastern coast of Asia and Australia; and though it is of great advantage to navigators in many parts of the Pacific, it renders navigation difficult and dangerous among the many islands lying between New Holland and Asia. It moves round

the southern coast of New Holland, between that island and Van Diemen's Land, and causes the great current to be met with in the strait lying between the two islands, and known by the name of Bass Strait.

Having now told you about the Gulf Stream, and what it does, let me say a few words about its causes.

Causes.—Many causes have been mentioned, but I should tell you, that great men, or, as the world calls them, philosophers, have been puzzled to account for the Gulf stream. Some writers have said that the Mississippi River was the father of this stream. Its floods they said produced it, and what led them perhaps to this conclusion was, that the speed with which the waters of this river flow, is equal to that of the Gulf Stream. But this was proved to be wrong by a very clever writer, Captain Livingston, who proved that the volume of water the Mississippi empties into the Gulf of Mexico is not the one 3-1000th part of the quantity which escapes from it through the Gulf Stream. And again, the waters of the Gulf Stream are salt, while those of the Mississippi are fresh.

Again, if the Gulf of Mexico did not receive as much salt water from the Ocean as leaves it through the Stream, it is evident that ere this, its waters would be fresh unless it was fed by salt springs below, or had a bed of salt beneath its water, neither of which appears to be at all probable.

Dr. Franklin accounting for this great marine river, or current, says "it is caused by the escaping of the waters that have been forced into the Carribean Sea by the trade winds, (which I shall explain in a future lecture,) and that it is the pressure of those winds upon the water, which forces it up into that sea, a-head as it were for this Stream."

Drift of Bottles.—Indeed, I should have observed that the waters of the Atlantic from every direction have a tendency towards this stream, and its fountain, the Gulf of

Mexico. This is clearly proved by the drift of bottles cast into the sea, a practice in frequent use amongst sea-faring men. They put a paper in the bottle stating the time and place at which it is thrown into the sea. Comparing the position of the places where they are found, with that from which they were thrown, navigators have concluded that many of them must have performed the tour of not only the Gulf, but the Gulf Stream also.

Sea of Sargossa—By some writers it has been stated that the level of the Gulf Stream is elevated in some places more than in others. How far this assertion is correct, will be seen from what I am about to tell you.

In the Atlantic Ocean, between Africa and North America, are situated three groups of islands, viz.:—the Azores, the Canaries, and Cape Verde. These groups form a triangular space in the Atlantic, which is known as the Sargossa Sea. It is of great extent, and the speed of vessels sailing through it is much retarded, owing to the sea weed which covers its surface. Its appearance frightened Columbus and his comrades very much when they first saw it, as they believed that their tour of discovery was at an end. This is not to be wondered at, for at the present day when the eye first falls upon it it appears to be quite solid, and one is apt to think he could walk upon its surface with safety, and to make it still more deceptive to the eye, patches of the weed are visible along the outer edge of the Gulf Stream as it flows along.

Now, many of you are aware that if you put bits of paper or any light substance in a basin of water, and cause the vessel to spin round, all the little substances floating on the surface of the water will be found to approach the centre. On the very same principle is the peculiar appearance of the part of the Atlantic, known as the Sargossa Sea, caused. The Atlantic is, so to speak, the basin to the Gulf Stream, and this sea is the centre.

The discoverer of the New World found this sea in his first voyage, and up to the present hour its main position may be considered the same as when the eye of the Genoese adventurer first rested upon it. There it is moving up and down, changing its position by turns, but ever keeping its main position all the while.

Velocity.—The waters of the Gulf Stream have been estimated to be carried around with the earth on its axis at the rate of 157 miles an hour quicker when they enter the Atlantic, than when they reach the banks of Newfoundland. When they enter the Atlantic they are carried round with the earth at the rate of 915 miles an hour, and this rate diminishes to 758 miles an hour when they have arrived off the banks of Newfoundland. Assuming that the waters of this stream move at the rate of four miles an hour, you may have an idea of its effect on the waters of the ocean, when I tell you that it keeps in perpetual motion one-fourth of the waters of the Atlantic.

The waters of this current are unequal in temperature ; the hottest being found at or near the surface. Like all things in this world, this Great Sea River has its offices and its uses ; and one of these is the influence which it exercises on the climates of those countries bordering on the theatre of its action.

From its fountain, the Gulf of Mexico, it conveys heat and warmth to western Europe, and renders the climates within the sphere of its influence, salubrious, soft, and mild.

There are many other currents of the sea worth our attention did time permit me to notice them, but I fear I have already dwelt too long on this part of my lecture. It will answer my purpose just now to tell you, that the many currents of the ocean have their parts to act in keeping its waters in their present state of pureness and freshness. To account for some of these currents has puzzled great men,

therefore humble individuals like you and me need not trouble ourselves farther about them. I am fully borne out in this statement by Maury, who, in his admirable work—"Physical Geography of the Sea," states, in alluding to the currents in the Pacific, that—

"There are also about the Equator in this ocean some curious currents which I do not understand, and as to which observations are not sufficient yet to afford the proper explanation or description. There are many of them, some of which at times run with great force. On a voyage from the Society to the Sandwich Islands I encountered one running at the rate of ninety-six miles a day.

"And what else should we expect in this ocean but a system of currents and counter-currents apparently the most uncertain and complicated? The Pacific Ocean and the Indian Ocean may, in the view we are about to take, be considered as one sheet of water. This sheet of water covers an area quite equal in extent to half of that embraced by the whole surface of the earth; and, according to Professor Alexander Keith Johnston, who so states it in the new edition of his splendid Physical Atlas, the total annual fall of rain on the earth's surface is one hundred and eighty-six thousand, two hundred and forty cubic imperial miles. Not less than three-fourths of the vapour which makes the rain comes from this waste of waters; but supposing that only half of this quantity, *i. e.*, ninety-three thousand, one hundred and twenty cubic miles of rain fall upon the Sea, and that that much, at least, is taken up from it again as vapour, this would give two hundred and fifty-five cubic miles as the quantity of water which is daily lifted and poured back again into this expanse. It is taken up at one place and rained down at another, and in this process, therefore, we have agencies for multitudes of partial and conflicting currents, all, in their set and strength, apparently as uncertain as the winds."

So much for the currents of the ocean, all of which contribute to the continual motion and preservation of its waters. Nothing without its use whether in the firmament, on the earth, or in the ocean. It is to be regretted, men, that we do not know more of the works of the Almighty One than we do, for the more acquainted we become with them, the more do we know how dependent we are on his will. Let us, at all events, imitate the waves and currents of the deep in obeying his Mighty Voice, especially when we know that it is He who poureth balm into our wounds, supports us in affliction, and wipes the tear from every eye.

Ocean Birds—The Gull.—The birds of the ocean shall now engage our attention for a few moments.

They are too numerous of course for me to notice in the limits of a lecture, however a few words on those which commonly present themselves to our view may be acceptable to you all.

I shall commence with the common Gull. This is a very bold and knowing bird having a very peculiar cry, half scream, half laugh; when heard during the storms at sea, it adds to the melancholy of the scene. The Gull is not easily deceived; for instance, if a piece of bread be cast on the surface of the sea, it will in a short time be picked up by one of those birds, though not a bird was visible in the heavens a moment before. But should a piece of paper or any other like substance float on the water, the Gull will not even stoop to look upon it, no matter how great its resemblance to bread may be. This shows at once the cunning and the instinct of the Gull. I have just told you that it is very bold, and in illustration of its boldness, I have only to remark that it will follow a vessel at sea for many miles, and keep so close to it, that

the sparkling of its eyes will be visible to those on board. The Gull's home is the sea, and when driven by storms to take refuge on the land for a time, he feels sad, and awaits with the greatest anxiety the welcome moment when he can return to the tossing main. Sea-gulls are to be seen in large numbers during fine weather, for on sunny days the fishes on which they prey swim near the surface of the water, and thus become easy victims to these birds, which may be justly called, feathered fishers. I should here tell you that during the storms at sea, these birds cannot seize on the fishes, and therefore repair inland where the earth-worm is to be found which serves as a substitute. I remember when a school-boy, I was very much taken with a verse written by our much lamented countryman Gerald Griffin, entitled "To a Sea-gull," which I shall repeat for you for more reasons than one.

"White bird of the tempest! O beautiful thing,
With the bosom of snow and the motionless wing,
Now sweeping the billow, now floating on high,
Now bathing thy plumes in the light of the sky;
Now poising o'er ocean thy delicate form,
Now breasting the surge with thy bosom so warm,
Now darting aloft with a heavenly scorn,
Now shooting along like a ray of the morn;
Now lost in the fields of a cloud-curtain'd dome,
Now floating abroad like a flake of the foam,
Now silently poised o'er the war of the main,
Like the spirit of charity brooding o'er pain.
Now gliding with pinion all silently furl'd,
Like an angel descending to comfort the world!
Thou seem'st to my spirit, as upward I gaze
And see thee, now clothed in mellowest rays.
Now lost in the storm-driven vapors, that fly,
Like hosts that are routed across the broad sky,
Like a pure spirit, true to its virtue and faith,
'Mid the tempests of nature, of passion and death,

Rise ! beautiful emblem of purity, rise,
 On the sweet winds of heav'n to thy own brilliant skies,
 Still higher ! still higher ! till lost to our sight,
 Thou hidest thy wings in a mantle of light ;
 And I think how a pure spirit gazing on thee,
 Must long for that moment—the joyous and free,
 When the soul, disembodied from Nature, shall spring,
 Unfetter'd at once, to her Maker and King ;
 When the bright day of service and suffering past,
 Shapes, fairer than thine, shall shine round her at last,
 While, the standard of battle triumphantly furl'd,
 She smiles like a victor, serene on the World !”

The simplicity and beauty of these lines are, I am sure, fully appreciated by you all—no matter how uneducated many of you may be—and may our death be so tranquil and so prepared that we shall bid farewell to the things of this life, and “ smile like a victor serene on the world.”

Tern, or Sea-Swallow.—There is another bird very common in our seas, the Sea-swallow, or the common Tern. It resembles the gull in many of its habits, but its flight is much more rapid. It is called the Sea-swallow from its resemblance to the swallow, so familiar to us all, and which visits this country during the summer months. The Sea-swallow is remarkable for its swift flight and the rapidity and sureness with which it seizes its prey, as it skims along on the waves of the ocean. The nest of this bird consists of a hole made in the sand along the coast above high-water mark, in which it deposits its eggs, which rarely exceed three in number. There are various species of the Sea-swallow, or common Tern, as it is frequently called.

The Cormorant.—The next ocean bird which I shall notice is the Cormorant, whose appearance is anything but handsome. Its color is black, and its long and hooked bill coupled with its yellow countenance and grey eyes, gives it an appearance not very pleasing indeed. This bird is most persevering in seeking its prey. While the heron

sits patiently on the water's side awaiting the fish unfortunate enough to seek the shallow waters, or the Gull flits across the ocean's breast, seeking its prey in the rolling waves, the Cormorant penetrates the waters of the deep in search of its prey, and defying the fishes in their native element, proves itself a more expert swimmer than the finny inhabitants of the deep, and a more skilful fisher than man himself.

Frequently during the winter season this bird takes up its abode along the banks of inland lakes and rivers, and commits serious ravages among our fresh-water fish. The Cormorant is a very voracious bird, and devours its prey with great greediness. Before swallowing its victim, the Cormorant seizes it crosswise in its mouth, and throwing it into the air, meets it as it descends with its head downwards. There is great instinct displayed in this; were the Cormorant to swallow the fish with the tail downwards, the fins, as the victim descended, would probably stick in the throat of the bird and thus cause death. Death has been known to be caused in this way both to the bird and the fish.

The plumage of the Cormorant, though apparently black, is really a very deep green. It builds its nest of dried sea-weed, and is usually to be found on the tops of high rocks; it is sometimes found on lofty trees. The egg of this bird is coated with a kind of chalk, so thick that it may be removed with a knife or sharp instrument. The number of eggs found in the nest of the Cormorant ranges from three to five.

Gannet.—The Gannet, or as it sometimes called, the spectacled Goose (from the very peculiar aspect of its countenance) is another bird that visits our shores, but more frequently those of Scotland. This bird is very easily known, as it appears to wear spectacles; hence it is called the

spectacled Goose. Men endanger their lives in search of the eggs and young of these birds in places frequented by them.

Guillemot.—The Guillemot is rather a curiously formed bird, and very remarkable in its nature. The female generally sits over one egg when hatching, and then assumes a most grave and solitary appearance. It will suffer itself to be removed by the hand, sooner than forsake the object of its care, and on this account it has been termed “foolish;” but the writer of a very interesting little work on these birds suggests, and very properly too, that the word “faithful” should be substituted for “foolish.” The egg of this bird is of a beautiful color, variegated with brown spots, and is generally found on a narrow ledge of rock, which makes us wonder how it escapes from falling, or how the young bird when it first sees the light is saved from destruction.

The Puffin.—The Puffin, or as it is sometimes called, the Sea-Parrot, is remarkable for its large beak, which is of the greatest service to this little bird. The beak is unusually large, that is compared with the size of the bird itself; but God, you know, consults the wants of all his creatures, and gives to them those things which they most require. The beak of the Puffin fully illustrates this; for had this bird the ordinary sized beak of other birds of its own size, it could not catch the fishes, which form its food, nor dig those cavities or hollows in the sand, where it deposits its eggs; nor would it be able to defend itself against the ravens and other foes, which endeavour to seize upon its eggs.

The birds of the ocean are too numerous to notice here, you must therefore be content for the present with the few here mentioned.

Ocean shells.—Now give me your attention and I shall tell you something about the shells found along our coast, and also of their inhabitants. Where all the empty shells came from

which we see along the sea-coast, and what became of the creatures that once made them their home, are questions that any of us might very naturally ask ourselves. These shells were placed there by the tides, and removed perhaps from some of the caverns or gardens of the deep, while their tenants have either died by natural causes, or have become the prey of other inhabitants of the sea. The little round holes you see in the strongest shells have been caused by creatures which you could almost crush to death between your fingers.

The cockle, the perriwinkle, the barnacle, the mussel, the scallop, and the oyster, being the most familiar to us, best admit of our attention.

Cockle.—The cockle shell is the most abundant of all those found upon our coast; the home of the cockle is beneath the sand, where it can remove itself with almost incredible rapidity. Those little jets of sandy water which we see on the strand mark the home of this little creature. The cockle has a natural spade by which he digs his hole, and which enables him to get to the surface whenever he desires.

Perrinwinkle.—The perriwinkle is also well known to us; it is very hardy, and will live a considerable time in confinement; it is rather a pretty little creature when seen crawling along in search of its food. The body of this curious little animal is marked with narrow spots of a darkish color, which give it a handsome appearance.

Razor-shell.—The razor-shell is also found along our coast; but though very familiar to you all, perhaps you know very little about its inhabitant. The following description of it may prove interesting and instructive.

“This creature burrows even deeper than the cockle, being often found at the depth of two feet. It does not, however, seem fond of sinking thus low, but generally remains sufficiently near the surface to permit the tube just to project from the sand. The burrow in which the animal lives

is nearly perpendicular, and in it the solen passes its entire life, sometimes ascending to the surface, and sometimes descending to the bottom of the burrow, for it has none of the locomotive faculties of its fellow-miner, the cockle. But although its range of travel is circumscribed, the narrowness of its habitation is compensated by the activity of its movements therein. The fisherman who wishes to capture this creature is aware of its agility, and takes measures accordingly; as the tide retreats, he watches for the jet of sand and water which the animal throws into the air, when alarmed by its hunter's footstep. Into the hole from which the jet ascended, the fisherman plunges a slender iron rod, which having a barbed, harpoon-like head, pierces the animal and retains it while it is dragged from its hole. If, however, the fisherman takes a bad aim, and misses his cast, he does not try a second with the same creature, knowing that it will have retreated to the termination of its burrow, whence it cannot be extracted."

Mussel.—The Mussel is also familiar to us, and is found clinging to the sea-beaten rocks skirting our shores. It is used as food, but to some constitutions it acts most injuriously, and instances upon instances have been known where the eating of this fish has proved fatal.

The Scallop.—The common scallop is found in great abundance on our coasts; its shell as you know is rather handsome, but not so beautiful as the creature itself. It changes its position at its will by the sudden, and indeed I might say powerful, motion of the water which it then contains.

The Oyster.—From very early ages the Oyster seems to have been a favorite fish of the wealthy and the great. Emperors honored them by their choice; and very wise and able men were extremely partial to them. Indeed, in times long gone by, if we can credit the historians then, it was not unusual for men to eat several hundred

Oysters daily. Ladies also indulged to the greatest excess in Oysters; indeed so much so that in this civilized age it would be considered gluttony.

The beautiful and spacious Port Jackson, on which Sydney the capital of New South Wales is situated, abounds with Oysters of an excellent flavor.

“Every inch of rock,” writes Colonel Mundy, “from Sydney to the Heads is thickly colonized by these delicate shellfish; that is, every inch would be so peopled, but for the active extermination incessantly going on. On any fine day, select parties of pleasure—and—Oyster seekers may be seen proceeding by water or land, furnished with the necessary instruments for an attack, or actively engaged in it. A hammer and a chisel, an Oyster knife, a bottle of vinegar, and the pepper pot, with a vigorous appetite, sharpened by the almost impregnable character of the foe—such are the forces brought into the field, and the inducements to destruction.”

In a recent number of the Irish Quarterly Review appeared a very humorous and instructive article on Oysters from which I take the following extracts.*

* Let me here pause and award to the editor of the Irish Quarterly Review, Mr. P. J. Murray, the testimony of gratitude to which he is entitled. To him the success of criminal reformation in Ireland is indebted in no small measure. During the last six years he has advocated the cause of criminal reformation, which is as yet but in its childhood in England, little more than in embryo in Ireland, and then and now urged upon the legislature and endeavored to impress upon the public mind the good that would be effected by the humane treatment which all under the control of Directors of convict prisons in Ireland receive. I believe, and I am sure none would more readily admit than Mr. Murray, that much of his best efforts have sprung from the close study of the writings of Mr. Recorder Hill, Miss Mary Carpenter, Mr. Frederick Hill, the various letters of Mr. T. B. Ll. Baker, and the luminous addresses of the late lamented Mr. Robert Hall, the Recorder of Doncaster.

“Oysters cast at the commencement of spring a spawn of a greenish color which resembles a drop of fat, in which may be observed through the aid of a microscope, an infinite number of little oysters quite formed and furnished with their valves, by which they attach themselves to the rocks, and to stones and other solid bodies dispersed in the sea. They attain quickly the power of reproducing others, and from the fourth month after their birth they can increase anew. At this period this species of mollusca become weak, lean, and spent; nor do they regain their size, quality, or flavour till towards the end of September.

* * * * *

“The Abbe Diquemare, who has closely observed the habits of oysters, assures us, that when free, they have the faculty of transporting themselves from one place to another, of causing the sea-water to enter, and emerge suddenly from between the valves; that they can in effect open and close them with such extreme quickness and force, as to produce a remarkable sound. It is by these measures they are enabled to defend themselves from other small animals, especially crabs, which try to get into their valves when half open.”

Oysters have been used as a medicine for the curing of many diseases. Their effect in stopping Diarrhœa is most sanitary and effectual; and persons affected with gout and scurvy have derived invaluable benefits from using them as an article of food. Oysters crushed in pieces with their liquor are used with much advantage as a cure for ulcers; indeed, this application of the oyster is of very old date, and is at the present day fully appreciated.

It would be intruding too far upon your attention this evening, were I to dwell further on the inhabitants of ocean shells; I purpose, however, in a future lecture to bring

under your notice those fishes of the sea with which you are best acquainted, and explain to you, as simply as I can, their wonderful structure and their peculiar nature, and habits; in doing this, I shall also be able to show you that the sea as well as the earth, is another great store-house provided by God for his creatures. Yes. His anxiety and his providence for man are strikingly manifested in the mysteries of the "Dark Blue Ocean," and here as everywhere, we find his goodness and his care entitling Him to our gratitude and our love. Have we not reason then, as we gaze upon this "Image of Eternity"—the ocean—to stand still, and consider the wonderful works of God.

"Such art thou—stupendous Ocean!

But, if overwhelmed by thee,
Can we think without emotion,
What must thy Creator be?"

TEMPERANCE AND SELF-CONTROL,

The subjects on which I shall address you this evening are of the greatest importance, not only to you, but to mankind generally. The subjects are Self-control and Temperance.

To the absence of self-control is to be attributed many of the miseries and misfortunes of man. Where it does not flourish, temperance never thrives, but the passions and desires assume an unbridled sway.

We must remember that there are many misfortunes in this life which are heedlessly brought on ourselves by indulging in certain vices, vices which are as repulsive to the feelings of the Christian, as they are offensive to his God.

Man, unfortunately, is more prone to evil than to good, and hence it is that the government of his evil propensities should engage his greatest attention, from the cradle to the grave. Bad example in youth has, no doubt, a great influence on the future man; and, perhaps, many of you listening to me this evening can trace your present condition to the examples set you in youth by drunken and profligate parents; it is equally true that many of you have inflicted wounds upon the hearts of good and loving parents, who are now, perhaps, earnestly praying for the return of the "lost one," as did the father of the Prodigal Son in the Scriptures, parents who have gone down with their grey hairs in sorrow to the grave; and again, there are some amongst you who have torn asunder the links which bound you to your wives and children; and in those humble but, perhaps, happy homes, left the brand of crime, with its blasting trail of sorrow, and desolation.

But what may many of you thank for this? Is it not the absence of self-control, and the domination of the foul fiend, Intemperance? Is it not your being unable to govern or hold in check the evil propensities of your nature,

you allowed yourself to be led into the commission of crimes, for which the laws of God and man call aloud for atonement.

To avoid, in future, the mishaps of the past, you must first be temperate, and ever hold in detestation the life and career of the drunkard. That you may the better do so, I shall here offer a few remarks on the drunkard's career—remarks you yourselves know to be borne out by facts that have even come under your own notice.

The drunkard contracts the habit of indulging in spirituous liquors, a habit that grows with him day by day, till at last it plunges himself and his family into misery and ruin. He does not contract this habit all at once. No, it slowly creeps on; and at any stage, if the victim possessed a spark of self-control, he might have checked his downward career to the vile slough of confirmed intemperance, and its pestilential train of demons—discord, sin, an untimely end, and an unwept death-bed. When we see a man deprived of reason, of modesty, or shame, by drink, we are too apt to pass by and look upon it merely as an every-day occurrence. The blasphemy vomited forth by him in this hideous state, his impure and unchaste expressions, may pass unpunished by the laws of the land; but there are other laws, laws which the drunkard cannot violate with the same impunity—the laws of God. The truth of what I say may be gathered from the words of Holy Writ itself, which says that the drunkard shall never enter into the kingdom of heaven. But even in this world the drunkard is punished, and what is worse, he brings punishment and misery on others.

Who can describe the drunkard's career?—who can tell of the miseries and privations of his family?—who can describe the wretchedness of his home?—who can relate the history of his children?—and who, let me ask, can reflect on his sad end without horror and dismay?—hurried,

perhaps, into eternity without time being allowed him to say, "May the Lord have mercy upon my soul."

I have stated that, even in this life, the drunkard is punished. How often does it happen that he sees his wife die of a broken heart, his sons the inmates of our penitentiaries, or the living freight of our convict ships—while his daughters live on the cursed pay of prostitution, and, like the parent, meet an untimely and reprobate death. Nay, in moments of remorse, the guardian angel long since fled, scared away by untold crimes, those poor, abandoned daughters of infamy and bad example, seek death by their own hand.

"One more unfortunate
Weary of breath,
Rashly importunate
Gone to her death.

Who was her father?
Who was her mother?
Had she a sister?
Had she brother?
Or was there a dearer one
Still, and a nearer one
Yet, than all other?

Alas! for the rarity
Of Christian charity
Under the sun!
Oh! it was pitiful
Near a whole city full,
Home she had none."

There are some amongst you who already are, and almost all of you will, one day, be fathers. Now, let me ask you, after all you wept, sinned, and suffered, would you wish that those children, sent you by God, would be placed in the position you now occupy, even favoured (in comparison to others) as it at present is? Let me ask you would you wish your daughters to earn their bread by

infamy? No, you would *not*. I will answer for you. Well, men, remember when you go forth to the world the *example* that is required of you, in order to guard against those horrors I describe. Control your selfish propensities, govern your evil nature, and resolve to begin as new and good men.

Once you pass the dangerous gate of Intemperance, you lose all control of yourselves—like a stone, once put in motion from the top of a high mountain, increases in velocity at every bound as it descends, until it is plunged into the abyss below; thus this scathing blight, this curse of our beautiful land, Intemperance, has lost many millions of souls to heaven.

In speaking to men of your fallen class (and let me here impress on you, that when, in addressing you, I make use of the word *fallen*, I only use it as a gentle reminder of your state, and the expression is accompanied by a well-founded hope springing up in my breast, that you are repentantly working your way on the high road to the social position which your Almighty Maker intended you should fill,) it is necessary, I say, that when I speak to men of your fallen class of self-control and self-government, I should advert, at the same time, to Intemperance.

The temptations are so numerous, and, when you can purchase a momentary forgetfulness of your woes for a few penny-worths of whiskey, you fly to it—unmindful of the miseries and the horrors which follow. This is the time for which the arch tempter is waiting—Satan, himself, marks his opportunity—rushes in at the this fatal moment, and seizes his prey.

At the awaking hour after a drunken debauch, many, many made the first false step that eventually led to cells, chains, lashes, and the felon's death. Sweet are the blessings of temperance! Untroubled is the sleep, and bright and hopeful is the morning of the temperate man.

Now, men, you may take my word for it, there is no certain safety to you after having entered the world without the Temperance Pledge. Poor, weak mortality!—*one* glass is *two*, two calls for *three*, and so on: so, I repeat again, there is no certain safety for you but the *Teetotal pledge*. I know it, I feel it thoroughly: my own thoughts, feelings, and wishes are wound up in your fate.

The conduct of the men who pass under my notice in this little hall is, at this period, of the utmost importance to the sacred cause of philanthropy and mercy. The world distrusts you—after you enter the world you will be on a greater trial than when you stood before the judge in open court. Many eyes will be on you, and the slightest slip will not go unremarked—nay, will be exaggerated. So, bear in mind what great mischief you will do to the unfortunates of, perhaps, another generation, if you misconduct yourselves again.

At this moment your case, your present state and future prosperity, engages the attention of both the Parliament and press of these kingdoms. On you, then, on you, the very men now listening to me, much, very much depends. Oh, how necessary it is for you to be always on your guard after you leave this.

Remember those you leave behind, and let not your misconduct hereafter rivet their chains. Say to yourselves, my conduct will speak for myself, reflect credit on me, and help to unbar the prison doors of my poor companions remaining in Smithfield. The Teetotal pledge will be the passport of my safety. I will shun the dram-shop as a plague—the proceeds of my honest earnings shall never enter the till of the thankless publican. Say, when temptation comes, I will have recourse to prayer, and humbly and earnestly implore of God to strengthen me to resist the Evil One, and allow the temptation to pass away,

Men, it is to you that religion opens widest her ever glorious gates—it is in misfortune that its holy balm steals more quietly and sweetly into the wounded heart, and raises the poor spirit to hopefully contemplate a calm and sunny future.

“And sorrow touched by thee, grows bright
 With more than mortal ray,
 As darkness shows us worlds of light
 We never saw by day.”

I have endeavoured to trace the miseries and misfortunes of the drunkard to the absence of self-control; but the want of this quality is equally to be deplored in another point of view: I mean the giving way to anger, to hasty, passionate expressions, wounding the feelings of all around—nay, worse, striking those that are nearest and dearest to us while the ungovernable fit lasts.

The passionate man, in his frenzy, sets all laws, human and divine, at defiance; how many have, in this hour of ungovernable fury, dealt a death-blow to a near relative, or bosom friend. Days, years of sorrow and remorse, have frequently followed a blow, hastily given to those bound to us by ties of affection and love.

The world is crowded with what we term ill tempered men. They are often called by the mild term of men of hasty temper. We frequently hear it said of a man that “he has a hasty temper: but it is all over in a moment;” “he is a very good-natured fellow, and cannot help his temper.” This is pretty reasoning—nice excusing, after a man indulges in all the viciousness of temper, leaving heartstings at every word—flinging, perhaps your sister’s shame or brother’s misfortune in your face. When they condescend to cool, you must, I suppose, pocket all those insults, and say “you were very hasty, but you are very good-natured.” Yes, and in another hour, perhaps, the hasty, passionate man repeats

his dose of insult and fury. Now, men, do you understand me, where was this man's self-control all this time?

Is not his hasty temper the grossest self-indulgence. Couple this species of temperament with intemperance. Think what dens of sorrow the passionate drunkard creates—what amount of misery does he not cause. When he dies, think you wives can regret him; why, in spite of themselves, in spite of their duties, his death must be a relief to them. As soon as children come even near maturity, they instinctively fly from the stormy homestead. Oh, that we could ever bear in mind that a soft answer turneth away anger; or, remember the advice of St. Paul,—“Be angry, and sin not; let not the sun go down upon your wrath.”

The decay of the intellectual powers make men peevish, passionate, and unbearable. The long use of strong liquors enervates the frame, weakens the power of the stomach, and leads to countless ills—amongst others, the habitual loss of temper. Thus you see, men, how wedded together are those two evils, Intemperance and Bad Temper. Long indulgence in both gives them an entire mastery over us. Anger, like too much strong drink, hides us from ourselves, but exposes us to others. If the man who has for years been a confirmed drunkard can form and religiously keep a resolution or pledge to refrain from the fatal poison, the man who has often been intoxicated with anger should go and do likewise. He can but try—the effort may be crowned with success.

Those amongst you affected with the sad disease of Bad Temper—those amongst you who are easily excited to anger, and in this anger make use of expressions more becoming demons than Christians, to you, I say, think of Him who taught the devotion of perfect love, He who, in the agonies of death, prayed for and forgave his enemies. Do this, and your reward will be great and certain.

I shall conclude, for the present, with the words of the Divine Author of our faith—"Love your enemies: do good to them that hate you, and pray for them that persecute and calumniate you."

AUSTRALIA.

The country which I shall introduce to your notice this evening is one of much importance, but perhaps to none is its rise and progress more interesting and important than to the present audience. Doubtless there are many, amongst you whose honest and industrious relatives have contributed their mite in raising Australia to its present flourishing and prosperous condition.

Situated in the South Pacific Ocean is the continent of Australia, consisting chiefly of the island of New Holland (now generally known as Australia), Tasmania or Van Diemen's Land, and the island of New Zealand &c. In the island continent or New Holland are comprised the principal British Colonies of Australia all of which it is my intention to notice in their proper course, but I cannot promise to do so in the present lecture.

Up to the beginning of the sixteenth century this division of the world was perhaps unknown to Europeans. The Chinese navigators had some knowledge of the northern coast of the continent at a very early period ; but I am not prepared just now to tell you the exact time.

In the early history of the discovery of this division of the world, the Spaniards are entitled to the first place. The discoveries made by them of this continent however neither contributed to enlarge their foreign possessions, or to enrich the parent country as they were merely accidental and led to no permanent settlement.

From the beginning of the sixteenth to the early part of the seventeenth century, nothing definite or satisfactory was known about these southern lands.

The name Australia, by which the island of New Holland

is now generally known, was suggested by the enterprising Flinders of whose history you will hear a little by and by. The Dutch, (natives of Holland in Europe,) were at this time a very adventurous and sea-faring people and gave to the world the first accurate knowledge of the country now under notice. They called it New Holland after exploring its northern coast, and continued for the first half of the seventeenth century to be the principal discoverers.

Late in the eighteenth century (1770), Captain Cooke explored the eastern coast, and gave it the name of New South Wales from its resemblance to South Wales in the mother country. The first landing place was Botany Bay, a name by which the whole continent was up to a recent period unfortunately known. The exact spot where Captain Cooke first landed remains up to the present day a swampy district in the neighbourhood of Sydney the Capital of New South Wales, and resorted to by idlers to drink and smoke. Botany Bay is thus described by Colonel Mundy in his very interesting work "Our Antipodes."

There are two good hotels on the north shore of this basin called after Sir J. Banks and Captain Cook; and the point on which La Perouse' monument stands may be nine miles from Sydney. To the former there is a pretty good turnpike road, besides innumerable tracks for equestrians across the stunted scrub-land. To the latter there is nothing that can be called a wheel road, but a sandy galloping ground for horsemen, soft as the riding-school tan. It must be the pure love of fresh air and exercise that tempts the rider in this direction. Barren, hopeless, unblest tract; scrubby, rocky, sandy, and boggy by turns; except in the short season of the bush flowers, one would suppose that it had been named "Botany" in bitter irony, unlucky name, retained to the discredit of the whole colony, by reason of its associations in the popular mind!

The sterile desert lying between the Bay and Sydney contains the greatest treasure—the life blood, it may be called of the metropolis. Without a fresh water river, built on a rock unfavourable to well-digging, without tanks to catch the unfrequent rain, Sydney would die of thirst, and die unwashed if it were not for the Lachlan swamp.”

As it would be impossible in a lecture to enter into a detailed account of the early discoveries and explorations of this continent and its adjacent islands, I shall merely give you a brief, and perhaps I may add an interesting sketch of their early history, and likewise allude to the great men to whose labours and enterprise England is indebted for this accession to her power.

The Spaniards, early in the sixteenth century, made some incidental discoveries in the course of their voyages from their possessions in South America. They were succeeded by the Dutch, who continued their discoveries for many years afterwards. The first accurate report of Australia was furnished by Torres, a Spaniard, at the commencement of the following century. In this, as in many other instances, the English reaped the fruit of the toil and enterprise of Dutch navigators; for we find the illustrious Cooke hoist the British flag on the eastern coast of this southern world about one hundred years afterwards, and in the following words proclaim Australia a British Colony:—

“As I am now about to quit the eastern coast of New Holland, which I have coasted from latitude 38° to this place, (Possession Island, latitude 10° 30' S), and which I am confident no European has ever seen before, I once more hoist English colours; and, though I have already taken possession of several parts, I now take possession of the whole of the eastern coast by the name of New South Wales (from its great similarity to that part of the Principality), in the right of my Sovereign George the Third, King of Great Britain.”

Three volleys of firearms, fired both by the men on shore and on board, followed by three hearty cheers from his crew, concluded the proceedings of the memorable 21st of August, 1770. The land he stood upon while repeating the above words, he called Possession Island. This was Cooke's fifth landing on the eastern coast. It is mournful to contemplate that this able and enterprising man should in a short time afterwards, while exploring other countries, fall a victim to the treacherous savages of O-why-he, by whom he was murdered on the morning of the 14th of October, 1779. If this cold-blooded murder call forth our indignation, which no doubt it should and does, how ought we feel on hearing that the hands of men professing Christianity are employed in shedding the innocent blood of their fellows?

I have just observed that the illustrious but unfortunate Cooke landed five times on the eastern coast of New Holland. I shall repeat the names of the different landing places, and tell you why our navigator gave them the respective names which they bear to this day.

He first landed at a place now called Botany Bay (a dangerous harbour) on the 28th of April, 1770. It received this name on account of the great quantity of plants collected there by some friends of Cooke. On the 22nd of the following month we find him at Bustard Bay, where he shot a large bustard weighing 17lbs, a circumstance to which this point of the coast owes its name. On the 30th of the same month he landed on another part of the coast, which from the absence of water there at the time, he denominated or named Thirsty Sound. He next landed at Endeavour River on the 30th of June in the same year. It is supposed that this river was called after the captain's own ship the Endeavour, in which he sailed from England on his first voyage on the 30th of July, 1768, and in which he arrived at Spithead in England on the 30th of July 1771,

after circumnavigating the globe. His fifth and last landing place off the eastern coast was the spot called Possession Island which I have already noticed.

I here conclude my remarks on the gallant but ill-fated Captain Cooke, but before closing my observations on the early discoveries and explorations of the Australian Continent, I must mention the names of two other illustrious British navigators, who are not so generally known, I allude to the gallant Captain Flinders and his kind and able fellow-laborer Surgeon George Bass.

Flinders was born in Lincolnshire in England ; he accompanied Captain Hunter to New South Wales in 1795, who was to supersede Governor Philips. From early boy-hood Matthew Flinders displayed an adventurous spirit and a most inquisitive mind. Surgeon George Bass accompanied Flinders on his voyage in the same year on board the *Reliance*. They arrived in the colony about seven years after the first tree fell beneath the stroke of a British axe. For the following nine years Flinders and Bass continued to explore the coasts of New Holland, and it must be said, the principal and most important discoveries on the coasts are due to the enterprize of these men. Flinders first suggested that the whole island continent of New Holland should be called Australia. He circumnavigated Van Diemen's land in 1799, which from its discovery by Tasman in 1642 to that time was supposed to form part of the southern coast of Australia. It was his colleague Surgeon Bass who first asserted that a passage of water lay between the Island of New Holland and Tasmania, or Van Diemen's land, an assertion proved to be correct by Flinders, who called it Bass Strait in compliment to his brother officer. From the day these two men set out from Sydney on their first tour of discovery in their little boat "Tom Thumb," with one boy for their crew, till their departure from the

Australian coast for their native land, they never ceased their labors, the results of which have contributed more to the accurate knowledge of the new country than all the discoveries and explorations hitherto made. Yet, from cause or causes which I cannot tell, the labors of these men were unrequited, and their well-earned claims on a nation's reward and gratitude were permitted to pass unnoticed. In 1802 Bass left Sydney for England as mate of a trading vessel and we hear no more of him. Had he not inscribed his name on a small portion of the waters of the Pacific, it is probable we should have never known that such a man lived and perhaps would attribute his brilliant discoveries in the Australian world to some more exalted but less talented a man.

The following particulars relative to Surgeon George Bass, may prove interesting to you just now; I shall therefore read them as quoted by Mr. Samuel Sidney in his work "The Three Colonies of Australia."

"The mother of Mr. George Bass lived with them (the Calder Family) fourteen years, and died with them. Her son and only child George Bass was born at Ashworthy, near Sleaford, where his father had a farm, and died when he was a boy. The widow and son afterwards went to reside at Boston. From his boyhood he showed a strong inclination for a seafaring life, to which his widowed mother was much opposed. He was apprenticed to Mr. Francis, a Surgeon at Boston; and at the end of his apprenticeship walked the hospital and took his diploma with honor. But his inclination for the sea being unsubdued, according to a promise she made, she yielded to his wish and sank a considerable sum in fitting him out and buying a share for him in a ship which was totally lost. She was a fine, noble-minded woman of no ordinary intellect. Her son wrote

her long letters containing full accounts of his discoveries. These came into the possession of Miss Calder on the death of Mrs. Bass. A short time ago she thought to take a peep at the letters, went to the old box, but they were gone. The last time his mother heard of Bass he was in the straits of China. She expected him many years, thinking that he might be taken prisoner; but at last gave up all hopes, concluding that he had been wrecked and drowned. He had only been married three months when he sailed never to return. His widow is dead."

Let us now see what became of Flinders. From early boyhood Flinders gave signs of future adventure and enterprize. It is told of him that when first attired in buttoned clothes, he was found in the middle of a sea marsh, with his pocket filled with pebbles tracing the running streams and anxiously inquiring where they came from.

Flinders continued his brilliant career of discovery on the coasts of New Holland and some of the islands in that locality till about the year 1804, when he set sail for England with a view to lay before the Admiralty the result of his labors. The same writer, from whom I have just quoted, speaking of poor Flinders, thus writes:—

In the miserable Cumberland, Flinders, intent to lay the results of his researches before the Admiralty, set out on a voyage of sixteen thousand miles to England: every man of his crew except his clerk, volunteered to share the danger and accompany him, but the leaky state of his craft compelled him soon to seek shelter at the nearest port and he put into Mauritius, relying on his passport: this would have been a sufficient protection had the government of the Island been in the hands of a gentleman and a man of honor; but the governor was one De Caen, a low malignant, envious, insolent wretch, who to the infinite disgust of many of his countrymen and companions in arms,

availed himself of the misfortune which had thrown Flinders into his power, to vent his spite on a nation and on a native he detested.

De Caen seized the *Cumberland*, took possession of the charts, journals, and log-books, and detained Captain Flinders for six years, during which period, in spite of the representations of the French Admiral Linois, and of many of the most respectable colonists, he treated him with every kind of cruelty and indignity; and after evading repeated orders for his release, dismissed him as unceremoniously as he had seized him, detaining however, one log-book, which Flinders was never able to recover. In the meantime appeared an account of Captain Baudin's voyages—the Captain Baudin who had received at Port Jackson every kind of attention and information. In this work, accompanied by an Atlas, the discoveries of Flinders and Bass were appropriated wholesale and unnamed. Baudin had made about fifty leagues of discovery and claimed nine hundred leagues, part of which had been surveyed by the Dutch a century before his time.

Flinders reached England in 1810, broken in health, but his spirit of duty unimpaired. Under the regulations of the service, the time he had passed in unjust imprisonment could not count in his professional employment. At length he petitioned the Prince Regent for promotion, as an act of grace; but his prayer was refused, and neither his widow nor his daughter was able to obtain the pension to which his eminent services formed so strong a claim.

Flinders devoted the last days of his broken health and spirits, to preparing his books and maps for the press—an admirable work, which has been the foundation of every subsequent exploration and colonization in Australia, and died on the 14th of July, on the very day his account of a voyage to Terra Australia was published."

I have now given you a brief sketch of the history of Matthew Flinders, who by his unremitting labor and enterprising genius has contributed most materially to extend the sway of British power, who has given in fact a southern world to those who wield that power; surely such a man is well deserving our sympathies.

While suffering the pangs of disappointed hope and a broken heart, which he did before his death, poor Flinders might well say.—

“ My days are in the sere and yellow leaf ;
The flowers and fruits of life are gone ;
The worm, the canker and the grief
Are mine alone.”

Physical Features.—So much for the early discoveries of the Australian Continent; the next thing we shall consider is its physical features, the first of which I intend bringing under your notice is its surface.

Surface.—Though not warranted by explorations yet made of the interior of New Holland to arrive at any conclusion regarding the elevation of the land or the nature of soil which composes it, nevertheless, from the absence of large and navigable rivers throughout the island continent we may infer at least that the interior is not mountainous. The celebrated Mrs. Somerville is of opinion that, “ however unpropitious the centre of the continent may be—and the shores generally have the same barren character—there is abundance of fine country inland. In the north all tropical productions might be raised, and in so large a continent there must be extensive tracts of arable land, though its peculiar character is pastoral.”

Position.—Looking at the map of Australia now before you, it is evident from its position on the surface of the earth that it must have two climates. The Tropic of Capri-

corn dividing it unequally causes the northern portion of the Continent to enjoy a tropical climate; while the portion south of the Tropic lies in the South Temperate Zone, and therefore its climate must be temperate, that is, neither too hot nor too cold.

The island to the north is New Guinea, which is separated from Australia by a passage of water, known as Torres strait; called from Torres, a Spanish navigator who passed through it in 1606, and to whom we are indebted for the first accurate report of continental Australia.

Torres Straits.—At the eastern extremity of Torres Straits, extending from New Guinea to New Holland, there is an immense number of Coral Reefs, running close to each other from east to west; of which reefs the eastern ends or extremities, terminating abreast of each other and forming a long line north and south, nearly on a level with the surface of the water, present to a ship approaching them the appearance, of a low wall, which is called the Barrier, but some of the channels between these reefs are found passable for ships of any burthen.”

This object (the Barrier) to a person on board a ship approaching it, and impelled by a strong breeze, when the sea is breaking over it in all directions, certainly exhibits a most sublime and somewhat terrific appearance.

The island to the south of New Holland is Van Diemen's land, discovered by Tasman in 1633, and visited by Captain Cooke in 1777. It was considered part of New Holland up to 1779. A British settlement was established on this island in 1804, at the mouth of the Derwent, and under the name of Hobart Town. It is still a convict colony of Great Britain, but with God's help the day may yet come when the arrival of an Irish convict on its shore will be a matter of surprize and astonishment to its rulers, and as far as Ireland is concerned, they may await in vain the arrival of the convict ship.

Men, you will then prove that the treatment which you here receive at the hands of the British Government, acting, as they do, mercifully and indulgently towards you, is fully appreciated.

The area of Van Diemen's land is about 27,000 square miles, and its harbours are not surpassed for depth and safety by those of any other country in the world. The following extract is taken from a letter from the Governor of the colony dated 3rd November, 1850.

“ Upon Hobart Town the amount of rain falling annually varies from 15 to 25 inches. January, February, and March, the summer months, are generally dry, but of course the climate varies very much according to position. The central part of the island is about 3000 feet above the level of the sea, and this portion may be said to form a plateau covered with lakes, from which nearly all the rivers in the island flow in different directions. In many parts of the country, vegetation suffers from summer frosts; the low damp valleys appear to be most subject to this infliction, from which the sides of the hills appear to be exempt in a great measure. The winter is never severe, snow seldom lies anywhere, except on the elevated plateaux, and on the mountain ridges for more than a day, and the climate is singularly healthy.”

Harbours and Bays.—I have mentioned to you that Van Diemen's Land is highly favoured by nature as regards her spacious and commodious bays and harbours. Such incidents are not alone confined to this island, but exist on a very large scale around the island continent of Australia itself. Many of the bays indenting the coast are capable of affording safe anchorage for all the navies of Europe. Among the principal Bays along the Australian coast may be mentioned, Port Jackson, Port Hunter, Port Macquarie, Port Stephens, Botany Bay, Trial Bay and Broken Bay.

Headlands.—The principal Capes and Headlands are,

Smoky Cape, Sugar-loaf Point, Green Cape, and Cape Howe.

Islands.—Norfolk Island, the Solitary Isles, and the five Islands of Illawara are amongst the chief islands of Australia. Norfolk island is under the government of Van Diemen's Land and is about 1000 miles east of New South Wales.

Rivers.—There are many tolerably good rivers in the continent, but few are navigable for any great distance ; or can be said to contain large volumes of water. On the whole the rivers of Australia are more insignificant in depth and volume than those in any other division of the globe. The following may be considered the principal rivers of Australia :—The Darling, which is said to flow 660 miles without receiving a tributary ; the Murray, which forms the boundary between Victoria and New South Wales, takes its rise close to Mount Koscuisko, and after flowing upwards of 1200 miles empties itself into the Ocean at Encounter Bay. The breadth of this river is 350 feet, and its depth 20 feet. The Murrumbidgee, which we may consider a tributary of the Murray, joins the latter river after a course of 900 miles. The Hunter is another fine river navigable for ships of large burden, for a distance of 400 miles from its mouth. Skirting the banks of this river are some of the finest farms in the world. The Swan River is the only one of note on the western side of the continent.

Lakes.—There are many extensive lakes in New Holland, the most important of which are, Lakes George, Illawara, Wallis, and Macquarie.

Mountains.—Almost parallel to the eastern coast of Australia, removed from it at a distance ranging from 40 to 150 miles, runs a long chain of mountains, the length of which is estimated at 1,500 miles, and rises from 2,400 to

4,700 feet above the level of the sea. The highest point is Mount Koscuisko, which though elevated but 6,500 feet above the level of the sea, yet its position is such that from its rugged and snow-capped top the eye can range over an area of 7000 square miles.

These mountains, are of a very craggy and rugged character, much more so, than one would expect from their height. In some places the tops are covered with forests but the greater part of them are crowned with needle-like rocks, which give them a most terrific and savage appearance. These mountains, as you may see, divide New South Wales into two districts, eastern and western; and form, indeed, a complete barrier between the country along the coast, and that lying west of the range. I need not tell you that this is a great draw-back to the interior country. To the eastward of these mountains, are what may be termed the agricultural peopled districts of the colony of New South Wales. Westward lie the wide pasture lands, which are amongst the finest in the world. These lands form a low, flat and unbroken chain. while on the east side of the range exists a most beautiful country, consisting of rich and verdant hills here and there grouped together. The country itself is richly wooded and undulating, having a soil rich and fertile, with a climate salutary and healthy, of which I shall speak more fully hereafter.

Description.—By many travellers the aborigines of New Holland are considered much below all other savage tribes in the scale of humanity. According to the European idea of beauty they are extremely ugly, but their countenances are not at all times unpleasing. The colour of the skin is sable or dark brown, the lips thick, nose broad and flat, mouth wide and the hair long and fine but not woolly like other savage tribes. The beards of the males are dark thick

and bushy, which added to their large white teeth and erect but slender figure, give them a noble and war-like appearance. The hair is much neglected by them, but when cared, as in the case of domesticated natives, it is a great ornament to the wearer appearing "parted naturally at the top of the head and hanging on the neck in shining curls."

Gait.—The gait of the Australian savage is strikingly manly, his movements graceful, his air and general carriage imposing; and as far as the figure and physical attainments of the man go, the native of New Holland is justly entitled to a place among the lords of creation, for he is "in native honor clad." The young men of these savages are considered by some travellers frank and well looking. The absence of one of the front teeth in the males of some tribes give them anything but a pleasing appearance. The extraction of this tooth is performed with great ceremony when they arrive at a certain age. The following description is given of the natives of this continent in the fourth book of lessons, page 154.

"The natives of Australia are either black or copper-coloured, very thin, with long straight hair, and extremely ugly features. They are among the lowest and most ignorant savages in the world. They wear no clothes, except a cloak of the skin of the opossum, which they throw over their shoulders in cold or wet weather, and tie round the neck. They bore a hole through the nose, in which they stick a piece of bone, and often paint themselves with lines of white clay. They sleep in rude huts formed of the bark of trees, never remaining long in one place, but wandering about together in companies, resting wherever they can find food. They have no idea of tilling the ground, or of keeping any sort of tame animal; but they live on such wild beasts or birds as they can catch, or on the few roots the country produces.

These last are dug out of the ground by the women, with a sharp stick."

Both males and females tattoo themselves. This is done "by a series of cuts on the flesh of the breast and shoulder, which by some special treatment, are made to heal in high ridges, having precisely the appearance of a weal from the severe stroke of a whip."

Character.—The character of the New Hollander is naturally fierce, treacherous, crafty and blood-thirsty. All efforts to spread the Gospel amongst them have been less successful perhaps than with any other savage tribes.

Though they build no houses owing to the wandering life they lead, yet wherever adequate supplies of subsistence are at hand they have comfortable homes and to their own minds contented. They have been employed with advantage as shepherds and police, but their love for a migratory life they seldom conceal.

Colonel Mundy, in his excellent work "Our Antipodes," gives the following interesting account of the native police force raised in New South Wales.

Native Australian Police.—"The experiment of enrolling as a border force a native mounted police, with British officers, has perfectly succeeded. In 1850, the division stationed on the Macintyre river consisted of forty-four men with a commandant, two subalterns and a sergeant-major. The pay of the privates is 3d a-day; their uniform a light dragoon dress. They are all quite young men, averaging five feet nine inches in height, light, but strong, and very quick at drill, the use of arms and horsemanship. In the Port Philip district a similar force has been raised. There is no want of recruits, nor need of "bounty," the only difficulty is to choose among the herd of long-legged shock-headed, grinning fellows offering themselves "the plenty fight" for 3d. per diem. They have no qualms about acting

with the utmost rigour against their brother black-fellows ; and such is the terror of their name, that wheresoever a section of the force shows itself the evil-minded tribes instantly disappear. Nor are the rangers of the bush, fairer in skin but equally dark in deeds, less afraid of these active, vigilant, and dashing black Hulans. Shepherds and stockmen no longer fear to quit their huts, and gentlemen graziers may now ride from station to station without arming themselves like an ambulant arsenal. For bush duties, especially against their own countrymen, the native police are infinitely more effective than the English police.

Food.—The food of the Aborigine consists principally of the Kangaroo, the Emu, the Opossum, a variety of wild fowl, fruits, grubs and fish. He catches the wild fowl and fish by means of nets which are made by the women for this purpose. The New Hollander is also fond of honey, “and the black deserves to enjoy this luxury for the dexterity with which he sometimes discovers its whereabouts. Catching a stray bee, he sticks upon its little busy body, with gum, an atom of white down from the owl or swan, and releasing the scared insect, follows it by the eye and foot to the hole in the hollow tree where the comb is concealed, and whence it is quickly cut out after the hive has been well smoked.” Some of their repasts are considered delicious.

There are many articles of food which the women are not allowed to use, some that the young men are prohibited from using, and others the old men only are allowed to eat. The latter are held in great reverence and respect by all tribes. There can be no doubt that they also consider human flesh a desirable article of food. By some travellers the New Holland savage is considered an “atrocious cannibal.” It is true they account the fat of parts of the human body a luxury, and instances are recorded when

the mother has murdered and eaten her own child, and joined in the repast by her brethren. According to Mr. Shaw, cases of infanticide were unknown among the natives until the arrival of the white man, who has stolen their lands, and killed and driven away the animals upon which they subsisted.

Women.—The women are treated by these savages most cruelly. “Wooded,” as it is said, “by dint of blows, they are governed ever after by club law.” They are not suffered to sit with the males while eating, and their food is thrown to them in a most degrading and dog-like manner. Woman is the beast of burden among the savage tribes of Australia, and is treated by them in a most brutal and wanton manner.

The smallest offence is punished by spearing the thigh, or being knocked senseless with a blow of their waddle or club. Yet, suicides are not common amongst them. The tribes are subdivided into families. The female members of a family are betrothed in childhood, and the wife and property of the man are invariably, on his decease, claimed by his eldest brother.

“Their treatment of the dead,” observes Mr. Shaw, “differs in different tribes: some simply inter the body, others burn it, while in the North they carry it in an envelope of the paper-like bark of the tea tree, and deposit it in a hollow tree until the skeleton only remains, which they afterwards convey to the burial place of the tribe; the bones of the dugong are often mixed with human bones in their funeral piles. The graves in Western Australia are always placed east and west. When first the Europeans came amongst them, the aborigines imagined they were the embodied souls of their ancestors and deceased friends.”

Language.—The language of the Australians is described as soft, and of considerable beauty and regularity. It is

spoken by women, perhaps with greater ease and volubility than by the men. The language differs in various tribes, so much so, that the language spoken by some tribes cannot be understood by others. Alterations are constantly being made in their "unwritten tongue;" the following circumstance is the cause. "Whenever a native dies his name ceases to be mentioned in any way in the tribe; if, therefore, it should be the appellation of some common object, a new word is created by which that object is in future known."

Weapons.—The principal native weapons are the spear, the waddy, the stone toma-hawk, and the boomerang; of the latter there are two descriptions. The boomerang is the most curious of all their weapons, and perhaps the most original.

The spear is between nine and ten feet long, about the thickness of the middle finger, and pointed at the end. The waddy, or club, is a heavy stick about two feet in length. It brains the enemy in the battle, or strikes senseless the poor "gen," (native woman,) in cases of disobedience and neglect. The stone tomahawk is employed by the black in searching for opossums in hollow trees, or in making notches in the bark of trees to enable him to ascend the top.

I have just stated that there are two kinds of the boomerang, one of which on being thrown straight a-head, returns to the thrower, while the other possesses no such peculiarity.

"I saw a native of slight frame," writes an author, already quoted, "throw one of the former two hundred and ten yards, and much further when a ricochet was permitted. With the latter he made several casts truly surprising to witness. The weapon after skimming breast high nearly out of sight, suddenly rose high into the air, and returning with amazing velocity towards

its owner, buried itself six inches deep in the turf, within a few yards of his feet. It is a dangerous game for an inattentive spectator. An enemy, or a quarry, ensconced behind a tree or bank, safe from spear or even bullet, may be taken in the rear and severely hurt or killed by the recoil of the boomerang. The Emu and Kangaroo are stunned and disabled, not knowing how to avoid its eccentric gyrations. Amongst a flight of wild ducks just rising from the water, or a flock of pigeons on the ground, this weapon commits great havoc. At close quarters in fight the boomerang, being made of very hard wood with a sharp edge, becomes no bad substitute for a cutlass."

Dance.—The corobbery or native dance cheers the long evenings of the native savages. After hunting they sometimes indulge in this amusement, but never till after dark. The women are the musicians on these occasions, and perform on a skin tightly stretched across their knees accompanied by their own voices. The men dance and utter wild howls; which added to the screams of the women, make the scene not one very entertaining, except in point of novelty. However, by them this amusement is considered healthy and pleasing. A gentleman who witnessed one of these dances, thus describes it, "The most amusing part of the ceremony was imitations of the Dingo, Kangaroo and Emu. When all were springing together in emulation of a scared troop of their own marsupial brutes, nothing could be more laughable, nor a more ingenious piece of mimicry.

* * * * *

"The men were tall and straight as their own spears, many of them nearly as thin, but all surprisingly active. Like most blacks they were well chested and shouldered, but disproportionately slight below the knee.

"The brandishing of clubs, spears, and other instruments

of war, ever accompanies the corobbery, which I need not mention adds still to its savage character.

Extermination.—I have already observed that the savage of New Holland is treacherous not only towards the white settler but equally so towards his own race, “his eye and hand are always ready for a victim.” His reason, such as it is, serves the purpose of the Tiger’s instinct, and has scarcely a higher office to fulfil.”

These tribes are in most instances very hostile to each other and their wars are frequent and bloody. In some cases it is to be feared their hostile disposition and envy towards each other, are encouraged by the white savage, who on more than one occasion have been known to adopt the most fiendish and murderous means to exterminate the natives. I am fully borne out in what I say by the following anecdote told by a gentleman whose authority is beyond doubt and contradiction.

“About nine years ago a party of Stockmen on Liverpool plains, having had their herds much molested by the natives determined on signal vengeance, and resolved to wreak it on the first blacks they met. Having fallen in with the remnant of a tribe, which having been partially domesticated with Europeans made no attempt to escape, they captured the whole of them, with the exception of a child or two; and having bound together with thongs, fired into the mass until the entire tribe, twenty-seven in number, were killed or mortally wounded. The white savages then chopped in pieces their victims and threw them, some yet living, on a large fire; a detachment of the stockmen remaining for several days on the spot to complete the destruction of the bodies. In this case the law was sternly vindicated; for the murderers having been arrested and brought to trial, seven of them in one day expiated their offences on the scaffold.”

In a few years hence the savage tribes of Australia will have passed away. Their vices, diseases, and frequent conflicts, both with themselves and the white invaders of their territories, contribute to their utter extermination. "Another circumstance which tends to shorten the duration of this race in the civilized districts, is that so few children are born among them; for among twenty-one tribes of 420 Aborigines, in the western part of Port Philip, there were but ten surviving children born in three years. It must be also noticed that wars have been more frequent of late owing to the trespass of one tribe upon the hunting ground of another, as the white man advances into the country."

There exists but little hope for the advancement in civilization of these poor creatures, though to use the words of a distinguished traveller, "They are as apt and as intelligent as any other race I am acquainted with; they are subject to the same affections, appetites and passions as other men. Efforts have been made and in some measure successful, in the training of the savage children, who are described as laughing, happy little creatures, but how long the good effect will continue is yet to be known. The wild coo-ee of the savage chieftain and his tribe will for a long long time be responded to, despite the arduous and God-like labours of those good men engaged in the spread of the Gospel amongst them.

"Just when these zealous pastors had begun to congratulate themselves that they had subdued to the fold a remnant of these black lost sheep, a body of wild natives would arrive and camp beside the walls, and next day both the newly arrived and a batch of half-converts had disappeared together. I can picture to myself the mortification of the good teachers, as the wild coo-ee of the savages reclaiming their kindred, rang through the forest, and obedient to the call, the half tamed pupils, with flashing eyes and answering cry, tore off their garments — symbols of in-

ipient civilization—and once more naked rushed into their native wilds.

‘ Give me again my hollow tree,
My *Kangaroo* and liberty !’

was their exclamation as these children of the bush, tired of boiled mutton, turnips, potatoes, and tea, and the twaddle (as they thought it) of the teachers relapsed into their natural savaghood.”*

In concluding my observations on the Aborigines of New Holland, let me hope that as the whiteman has derived, and deprived them of their hunting grounds, their fields, and their forests, he will give them in return not arsenic and strychnine, but his sympathy and pity, and remember

“ There is in every human heart,
Some not completely barren part,
Where seeds of love and truth might glow,
And flowers of generous virtue blow ;
To plant, to watch, to water there
This be our duty—be our care.

Minerals.—Amongst the minerals found in Australia, may be mentioned coal, iron, and copper, which are found in great abundance. To these may now be added gold, which in this part of the globe, has been discovered in greater quantities than in any other country heretofore known.

Gold Digging.—The first discovery of gold in Australia, was made by Mr. Edward Hargreaves, who, having a farm near Bathurst, went to California in search of gold, and was struck with the similarity between the rocks and strata of California, and those of his own district of Conobolas, some thirty miles west of Bathurst. On his return home, he accordingly examined the soil, and after one or two months digging, found a quantity of gold, April, 12th, 1851. He

* Our Antipodes, Page 115.

at once applied to the colonial government for a reward, which he readily obtained, with the appointment of commissioner of crown lands. The excitement becoming intense throughout the colony of New South Wales, rapidly spread to that of Victoria, and other places; and in the first week of July, 1851, an aboriginal inhabitant, formerly attached to the Wellington mission, and then in the service of Dr. Kerr, of Wallawa, discovered while tending his sheep, a mass of gold among a heap of quartz. Three blocks of quartz, from two to three hundred weight, contained 112lbs. of pure gold, valued at £4,000. These blocks were found on the Munou Creek, 50 miles to the north of Bathurst. The gold fever now became general, and the gold since found in numerous other places, and often in large blocks, has been of enormous amount; vast quantities, (many tons weight at a time,) being shipped to England, and the Continent of Europe, and to America. From the gold fields of Mount Alexander, and Ballarat, in the district of Victoria, up to October, 1852, there were found 2,532,422 ounces, or 105 tons, 10 cwt. of gold; and the gold exported up to the same date represented £8,863,477, sterling.

In all probability, neither all the gold mines, nor the richest land which Australia contains, have yet been discovered, and the results of further search, when aided by science and skill, and by concerted and systematic action, are likely to astonish the world.

Animals.—The principal animals found in Australia, are the dingo, or native dog, the kangaroo, which is the venison of the native, the emu, which is his pheasant, the wombat, the opossum, crane and black swan, and a variety of other animals and birds. At page 152 in the Fourth Book of Lessons, it is stated that “the animals, as well as the trees of New Holland differ remarkably from those of the other divisions of the globe. Some of their quadrupeds go on two feet; and

others have the bill of a bird. In this country black swans are not rare; and stranger still, their dogs do not bark; and their bees are without stings. But the animal which strikes the new settler as the most remarkable is the *kangaroo*, which usually stands erect on its hind legs; and when it wants to move with speed it neither walks nor runs, but hops or jumps along, with great agility. Of this animal there are thirty or forty species; some of which are large and strong, and others not much bigger than rats. They are hunted down by the settlers for the sake of their flesh and skin. These animals are called *marsupial* or pouched, because the female has a kind of pouch, or bag, underneath her stomach, into which her young always creep when they are tired or alarmed."

The following interesting and amusing account of a kangaroo hunt is from an eye-witness.

"This day was devoted by some of the resident gentlemen of the vicinity, to an attempt to show the governor the sport, *par excellence*, of the country, Kangaroo hunting. Under their guidance accordingly, well mounted and accompanied by three or four greyhounds of a powerful breed, we traversed a wide extent of forest land, where in ordinary seasons the animal was known to abound. In a long day's ride, however, we only found one Kangaroo, fortunately a good specimen of that kind known as a Red-flyer, a strong and fleet animal not less than five feet high. The bush was tolerably open, hampered only by fallen timber and occasionally rocky or craggy soil. The Kangaroo, which was feeding in a patch of long grass, jumped up under our horses' feet, and at first starting looked very much like a red-deer hind; its action was less smooth though equally swift; but no one could have guessed that it consisted only of a series of jumps, the fore-feet never touching the ground. A shrill tallyho from one of the finest

riders I ever saw made all the dogs spring into the air; two of which got away in pretty good turns with our quarry, and while facing the hill at a pace considerably greater than an ordinary hunting gallop, I thought we should have had 'Whoo-Whoop' in less than five minutes. After crossing a ridge and commencing the descent on the opposite side, however, the red-flyer showed us quite 'another pair of shoes,' and a pretty fast pair too. I never saw a stag in view go at all like our two-legged friend; and, in short, after a sharp burst of twelve or fourteen minutes, both dogs and men were fairly distanced. In about half that time I lost my place by riding at full speed into the fork of a fallen tree concealed in long grass, a predicament out of which there is only one means of extrication, namely, retreat; for cavalry has no chance against a good abattis.

* * * * *

"On the whole, taking into consideration the hardness of the ground, the stump-holes, sun-cracks, and deep fissures caused by water, the stiffness of the underwood and the frequency of the trees, living, dying, and dead, burnt and burning, the riding in a Kangaroo hunt may be considered tolerably dangerous." The same writer observes that "at bay the Kangaroo is dangerous to young dogs from the strength with which he uses the long sharp claw of his hind foot; a weapon nearly as formidable as the wild Boar's tusk. The animal when hard pressed, not unfrequently takes to a water-hole where from his stature he has a great advantage over the dogs, ducking them under water and sometimes drowning them as they swim to the attack. The tail of the Kangaroo makes excellent soup; the haunch is tolerable venison, but like most really wild venison it is too lean." The weight of the tail alone of the Kangaroo is sometimes over twenty pounds; at full

speed this animal's strides are said to equal those of the swiftest horses.

Many strange things might be told of the animals of this part of the globe, from the Kangaroo, which is said to leap upwards of 20 feet at a bound, to the harmless bee without a sting, and which produces the most delicious honey. The most curious of all the animals peculiar to New Holland, is that which is described as half bird, half bear, or possessing the bill and feet of the duck, and the body of a mole or rat. There is a great variety of birds in the continent, whose plumage is very beautiful. Parrots, parroquets, and cockatoos, with their splendid and varied colors of red, white, green, and purple, and the beautiful doves, equally splendid, give to the Australian woods a cheerful and pleasing scene.

The trees of New Holland are also worthy our notice. The majority of them come under the family of Evergreen, but there are trees in New Holland, which furnish fine and lasting timber.

That of the tall black and upright IronBark, is very strong and durable, perhaps it equals oak itself in these properties. The Stringy Bark and White Gum are also among the leading trees peculiar to Australia. I may also mention the Bottle Brush, the Exocarfus, or native cherry, and the Ana Wattle, or Accacia, which perfumes the surrounding air.

“ Most of the trees which are natives of Australia are evergreens. Their leaves generally grow edge-ways on the stalk, and have neither upper side nor under. One kind of tree, which our settlers call the grass-tree, has leaves like grass growing upon it. Another has a fruit which looks very like a pear, but if the traveller attempts to taste it, he will soon find his mistake, for it is as hard as wood. There is also a fruit like a cherry, which grows with the stone outside ; this is eatable, and tastes like an

indifferent damson. But very few of the fruits, herbs, or roots of Australia are fit to eat ; the principal ones are a sort of ground-nut, the root of the fern, and the stalk of the New Holland lily, a plant which bears a beautiful crimson flower. The soil, however, is extremely fertile, and suits all kinds of European fruits and vegetables, which are grown in great quantities by the colonists."

By this time, I hope, you know something more than you did about the great division of the earth, which has been under our attention for some time this evening. On to-morrow evening I shall tell you something about the parent British Colony of Australia, New South Wales—

"The land of the South that lies under our feet,
Deficient in mouths, overburthened with meat."

In concluding my lecture to-night I should not omit to state, that there are many little draw-backs to the White Settlers in this part of the World. For instance, in the uncultivated and uncleared districts of the country mosquitoes prevail, but, perhaps, not to such extent as in other parts of the globe similarly circumstanced. In many parts of America these stinging flies are far more numerous and annoying. They are peculiar to warm climates, and prevail most in marshy districts, where they are easily harboured. There are also snakes in Australia, some of which are poisonous. But the numerous and inexhaustible sources of wealth of the country (of course I speak of the settled and cultivated districts) far and away compensate for any disadvantages of this nature. To the honest, sober, industrious, persevering, enterprising, and self-reliant emigrant, Australia will indeed be found a land flowing with milk and honey.

I promised on last evening to tell you something about the British colony of New South Wales, occupying the

eastern side of the island continent of Australia, which promise I am now about to fulfil.

Colonization.—On the recommendation of Captain Cook, New South Wales was formed into a Penal Settlement on the 20th January, 1788, when the first Governor landed with 800 convicts at Botany Bay; but finding that place unsuitable in many ways for the site of a colony, without landing his charge he set out on an exploring expedition, and eventually selected the banks of an inlet in Port Jackson, on which now stands the rising and flourishing city of Sydney, the capital of the colony. The following account of the expedition is quoted from high authority:—

“The day was mild and serene. The expedition sailed along the coast near enough to see and hear the wild cries of the astonished natives, who followed them as far as the rugged nature of the land would permit. As they approached Port Jackson the coast wore such an appearance that Captain Philips fully expected to find Captain Cook’s unfavorable impressions realized; but he was destined to be most agreeably disappointed.

“The first tack carried the expedition out of the long, heavy swell of the Pacific Ocean into the smooth water of a canal protected by two projecting ‘heads,’ and soon they came in sight of a vast land-locked lake, stretching as far as the eye could reach, dotted with small islands, whose shores sloped, forest covered, down to the water’s edge. Black swans and other rare water birds fluttered up as the white strangers sailed on, charmed with a scene in which every feature was beautiful, yet strange. They had discovered one of the finest harbours in the world. Coasting round the shores of this great natural basin, Governor Philips determined to plant his colony on a promontory where a small

clear stream trickled into the salt water. After three days spent in exploration, he returned to Botany Bay."

Six days after the arrival of Governor Philips at Botany Bay, the Colony of New South Wales may be said to have been founded, and a party of about one thousand souls landed where one of the principal streets of the city of Sydney now stands.

"In March, 1787, accordingly, the 'Fort Fleet,' eleven vessels under command of Captain Philips, R. N. of H. M. ship *Sinus*, with 565 males, 192 females, and a guard of marines—in all 1030 souls on board, sailed from England. After eight months passage, they reached in safety Botany Bay. This spot was found sandy, swampy, and ill watered; the harbour shallow and exposed; the natives hostile. Philip searching further northwards, entered an inlet about ten miles from Botany Bay laid down in the chart of Cook's expedition as a 'boat harbour,' under the name of Port Jackson from the sailor who discovered its entrance. Astonished and overjoyed at the view of the magnificent haven, which had been veiled from the sea by the outer headlands, Philip hastened to remove the fleet from Botany Bay; and on the 26th January, 1788, it was anchored in Sydney Cove. On that day the epoch of transportation to New South Wales commenced; it terminated on the 23rd August, 1840."

I do not profess to give you a detailed account of the early history of New South Wales, nor do I see the necessity at present for doing so.

"Amazement and horror overcome us when we look back on the early days of New South Wales. The settlers were crowded together on a narrow space—a promontory cleared of a dense forest. The soil was a barren sand; every yard required for cultivation had to be gained by removing enormous trees of a hardness that tried the temper of the best axes, wielded in skilled hands. On one side was an unknown

shore and a shipless sea ; on the other an apparently limitless country, inhabited by savages, in which not a step could be taken without danger of being totally lost ; a country which produced no wild fruit or root fit for the sustenance of man, and with the exception of a wandering Kangaroo or a sly, swift emur, no game of any size fit for food."

During the twelve succeeding years the colony seems to have made very little progress, as may be inferred from the following extract taken from Governor Maquarie's first despatch :—" I found the colony barely emerging from infantine imbecility, suffering from various privations and disabilities ; the country impenetrable beyond fifty miles from Sydney ; agriculture in a yet languishing state, commerce in its early dawn, revenue unknown, threatened with famine, distracted by faction, the public buildings in a state of dilapidation, the few roads and bridges almost impassable ; the population in general distressed by poverty ; no credit, public or private ; the morals of the great mass of the population in the lowest state of debasement, and religious worship almost totally neglected."

Such was the state of New South Wales at the commencement of the present century. Let us now examine it as the home of the friendless and the poor.

Climate.—The first and most important thing to be considered by any man about making a new country his home, is the climate of that country. If not satisfied that it is favorable to his constitution, nothing should induce him to go there. The climate of New South Wales is at some periods of the year unpleasant, but at no time is it unwholesome. In this assertion I am fully borne out by the following statement of a gentleman, Dr. Lang, who is thoroughly acquainted with the country :—

" For eight months during the year—namely from the

1st March to the 1st November, the climate of New South Wales—which throughout the whole year, indeed, is at least equal, if not superior to that of any other country on the face of the globe—is peculiarly delightful. The sky is seldom clouded; and day after day, for whole weeks together, the sun looks down in unveiled beauty from the northern heavens. In ordinary seasons refreshing showers are not unfrequent; but although there are no periodical rains in the colony as in the Torrid Zone, it sometimes rains as heavily as it does within the tropics. It seldom freezes in Sydney and never snows; but fires are requisite during the day in the winter months, and for a considerable time longer in the mornings and evenings.”

Again, Colonel Mundy speaking of the climate of this colony says—“it is a glorious climate—glorious in its virile beauty—glorious in its freedom from lethal disorder—priceless with respect to this latter feature in the eye of those who have known what it is to serve in countries where death multiform rides on the wings of the wind, lurks in the forest and swamps, and rests in the crowded emporium.” With these statements before us, coming from such sources, we can have no hesitation in arriving at the conclusion, that the climate of New South Wales is not an unfavourable one at all events.

Soil.—The soil of New South Wales, and indeed of the whole continent, is of a very varied character. On the whole, New South Wales is not an agricultural country, but as a pastoral country, it stands pre-eminent beyond all others in the world. Skirting some of the rivers, and in various districts throughout the colony, farms abound, which in point of fertility, are not surpassed even in the best agricultural districts of the Old World. I have mentioned that, as a pastoral country, New South Wales is not surpassed by any other on the face of the globe.

“A strange result of the abundance of sheep, is the su-

perfluity of animal food. There is so much mutton that it is worthless in the pasturing districts. Sheep are valuable only for their wool and fat. The plan pursued with these animals is to drive them in flocks to the sea-ports, then slaughter them, and boil down their carcasses for tallow." Such advertisements as the following are not unfrequent—"S.—C., wholesale and retail butcher, will supply beef and mutton of good quality, at 1d. per pound."

Productions.—In fine, the soil of New South Wales is capable of producing not only the necessaries, but even the luxuries of life, and these in no niggard way; on the contrary, in such abundance, as to support millions more than the present population.

Exports.—The principal exports of the colony are grain, copper, wool, tallow, wine and gold. The wine and wool of Australia are held in great repute, and command attention in the English market. The wool, in particular, is every day becoming more prized and admired. At the present moment Australian wool enjoys the highest reputation in England and America, and holds the highest place in the market, and so readily and so profitably is it disposed of, that the cost of transport of 16,000 miles, goes almost for nothing in the calculation of profits. In 1852, a whole fleet of ships were required to convey the wool of Australia to the manufacturers of Yorkshire.

The Colonial Government of New South Wales is subject of course to that of the mother country. The governor and the chief members of his official staff is appointed by the home government. The salary paid to the governor of New South Wales is £7,000 per year.

What I shall now read for you, appeared in the leading newspaper of Sydney some few years ago, and clearly points out to the most ignorant here this evening, the state of the Colony at that time, nor have we any reason to believe that

this flourishing country has declined since the statement was made. On the contrary there are just grounds for the belief that it has steadily progressed.

“Our flocks and herds are increasing while the labour market is exhausted. Wages have constantly advanced at rates averaging on the whole somewhere about thirty per cent. We have ample employment for many thousands of British emigrants provided they be men who can give a good days work for a good days wages. We do not want loungers ; neither do we want any more of that swarming class of young gentlemen who can do nothing but sit on a stool and handle the quill. Of these we have always more than enough. But persons accustomed to hard work, whether mechanical or rural, and persons having money to invest, whether of large amount or small, will find in New South Wales a finer opening than any other part of the world presents, and than ever before was presented by any colony under the British Crown.

“Let them remember that for mildness and salubrity our climate cannot be surpassed ; that our soil is capable of producing all that man requires for sustenance, and most of the luxuries that he prizes ; and that at the one gold-fields were discovered the colony, with a population of less than 200,000 souls, possessed about 100,000 horses, 1,500,000 horned cattle, 8,000,000 sheep ; yielded an annual revenue £600,000 ; and expended of our own produce or manufactures to the extent of £1,100,000 per annum altogether, irrespective of her gold. Coupling these facts with the ‘great fact’ mentioned above, that in ten months we had shipped a million worth of our new found produce, the fruit of peaceful industry, and the earnest of a still brighter future—our friends in England must admit that our shores have strong attractions for all who think it better to emigrate than to stay at home.”

This statement of facts calls forth no comment from me, you yourselves can form as good an idea of the prosperous state of the colony as I can myself.

“A country which produces grapes, peaches, and oranges, on a large scale, in the open air, along with maize, wheat, potatoes, and other ordinary products, besides affording boundless pasturage for sheep and cattle, may be said to enjoy the greatest bounties of nature, and to be capable of yielding substance to millions of human beings.” If we add to this its immense gold mines, we must conclude that New South Wales is a country favored indeed by nature. The following is taken from a recent copy of the *North British Mail*.

“*Immense Nugget*.—We have had the satisfaction of inspecting an immense nugget, from the Australian mines in the shop of Mr. Muirhead, goldsmith, Buchanan-street. This nugget weighs 400 ounces, is of pure gold, without any apparent admixture of quartz, and is in the condition in which the lucky digger discovered it. It is valued at about £1,600, is the largest but one ever brought to this country, and is certainly a curiosity worthy of the inspection of the citizens. We believe it will remain on view in Mr. Muirhead’s for a few days.”—*North British Mail*.

Sydney, the capital of New South Wales, was founded by Governor Philips, in the year 1788, and received its name in compliment to Lord Sydney, one of the Lords of the British Admiralty at that time. For many years it continued to be a British Penal Settlement; it is not so now, nor is any part of the Australian continent, the English government having determined to send no more convicts to Australia. This was announced in the House of Commons by Lord John Russell, on the 10th of February, 1853.

Where situate.—Sydney is situated on “Sydney Cove,” in one of the finest harbours in the world, Port Jackson,

to which I have already alluded. The founder of Sydney, Captain Philips, was induced to select the present site of the capital, in consequence of discovering a small river running between the two promontories forming Sydney Cove, but there were other inducements besides this, namely, a fine harbour and abundance of wood and water. Sydney is removed five miles from the entrance of the harbour, which is marked by two very high projecting capes or promontories, called "The Heads." Port Jackson is fourteen miles in length, and lies thirteen miles north of Botany Bay. Sailing vessels, bound for Sydney, generally pass through Bass's Straits, and the scenery along the coast is thus described by Mr. Cunningham :—

"The shore is bold and picturesque, and the country behind gradually rising higher and higher, into swelling hills of moderate elevations, to the utmost distance the eye can reach, is covered with wide-branching, evergreen forest trees, and close brushwood; exhibiting a prospect of never-failing foliage, although sadly monotonous and dull in tone compared with the luxuriant summer foliage of Europe. Grey rocks at intervals project among these endless forests, while here and there some gigantic tree, scorched dead by the summer fires, uplifts its blasted branches above the green saplings around."

"The mouth of the harbour is about three-quarters of a mile, and is protected by the heads from the streams of the Pacific. This beautiful land-locked lake is capable perhaps of affording safe anchorage to all the navies of Europe. Numerous coves, creeks, and inlets indent its shores, which, in years gone by, were covered to the water's edge with the finest timber.

"Prior to my landing at Sidney," writes Mr. Shaw, "I had frequently heard of its harbour; but I did not anticipate seeing one of the finest things I ever beheld. I have visited the great Lakes of North America, the Lake of

Geneva, the Fords of Norway, and the various indentations of the Coasts of Ireland and Scotland; but none produced an impression surpassing that which I felt when I first beheld the magnificent and peculiarly beautiful scene of Sydney Harbour. The land which surrounds the harbour is hilly not timbered, but scrubby, and the soil like that of the coast, poor, with large stones protruding through it, looking at a distance like boulders. These rocks contrast singularly with the uniformly stunted scrub. The hills, covered with their peculiar vegetation, form as wild a scene as any to be found in the interior of the great Australian continent, although within a few miles of the metropolis of New South Wales; and the many and beautiful little bays, with a number of islands, and splendid stone mansions here and there scattered over the hills around the harbour, taken altogether, form probably one of the most striking and truly picturesque scenes in the world."

Population.—The population of Sydney is about 50,000. The inhabitants are active and enterprising; religious feuds seldom take place amongst them, the industrious and persevering have no time to spare to indulge in these party feelings which have ever proved the bane of our country. Hence it is that the rapid rise of not only the metropolis, but the whole colony, is unequalled in the annals of colonial history.

The people are described as being well dressed and well behaved, and the poor immigrant after a short time is wonderfully altered for the better. It is perfectly surprising how quickly the immigrants after their landing assume not only a better style of dress, but also a better style of manners, and this applies more or less to all the colonies.

To the moral tone of society in Sydney, Colonel Mundy bears testimony in the following words:—

"I have heard the society of Sydney accused—I have

heard them accuse themselves of an addiction to scandal, and tittle tattle, and I dare say many people who know the city quite as well as myself, will disagree with me when I exonerate the good people in general from those vices, or at least from possessing them in an inordinate degree."

People.—The people of New South Wales are indeed a working people. There is no aristocracy there, the governor himself must be a working man. All are up and doing, there is little time for gossiping, slandering, and back-biting. Self-reliance meets its reward, and want of it its punishment. No nobler quality can a man possess at home or abroad, than honest self-reliance.

Postal Arrangement.—There are upwards of a hundred post offices throughout the colony, and though the number of letters received from all parts of the world yearly is exceedingly great, yet the postal arrangement is neither perfect nor even satisfactory.

Religion.—There are many beautiful religious edifices or churches in the metropolis and other towns in New South Wales, and to every religious sect all toleration is shown and abundant church room afforded.

Amusements.—There are many places of amusement in Sydney, the theatres are well attended, and the games of boyhood are nearly the same as with us, and frequently is the adventurous, and perhaps friendless immigrant, reminded of his by-gone days, and thinks he hears "the sound of time long past," or the voices "of those who long within their graves have slept." Of course when I speak of the amusements of Sydney, I do not by any means advise you to seek them, nor do I wish to be understood as one of those persons who are opposed to amusement, provided the amusement be harmless, and does not interfere with business. I remember reading a very pithy and true saying of a wise man, which is well worthy a place not only in your

memories, but in the memory of every one. It is this—
“Take pleasure in your business, and it will become your recreation. Hope for the best, think for the worst, and bear whatever happens.”

Letting of Land.—In New South Wales, as in all new colonies, land is to be had at a very low rate, of course I mean in the early stages of colonization. The price of land in Sydney and its immediate vicinity, differs very much now, from the time when Governor Philips first landed. By an order made in council in 1847, relative to the letting of what are termed the unsettled districts of the country, the Governor is empowered to grant leases for any term of years not exceeding fourteen. The clause referring to these lands runs thus:—

“The Governor is empowered to grant leases of runs for any term or terms of years, not exceeding fourteen years in duration, for pastoral purposes; with permission, nevertheless, for the lessee to cultivate so much of the lands respectively comprised in the said runs as may be necessary to provide such grain, hay, vegetables, or fruit, for the use and supply of the family and establishment of such lessee, but not for the purpose of sale or barter; and so, nevertheless, that such leases shall in no case prejudice, interrupt, or interfere with the right of the Governor or other officer for the time being, administering the government of the said colony, to enter upon any of the lands comprised in the said leases for any purpose of public defence, safety, improvement, convenience, utility, or enjoyment. The rent to be paid for each run to be proportioned to the number of sheep, or equivalent number of cattle, which the run shall be estimated or capable of carrying, according to a scale to be established for the purpose, by authority of the Governor. Each run shall be capable of carrying at least 4,000 sheep, or equivalent number of cattle, according to the scale

aforesaid, and not in any case be let at a lower rent than £10 per annum, to which £2 10s. per annum shall be added for every additional 1,000 sheep, or equivalent number of cattle, which the run shall be estimated as capable of carrying. The rent to be paid yearly in advance."

This is very cheering and very encouraging to the enterprising poor man. We need not wonder at the thousands who seek the shores of this land of promise every year. And I sincerely hope the day may yet come when many of you will add to the number. Perhaps it will not be out of place here, to give you an advice as regards emigration. I offer it to you, as you are all well aware, for your own good.

There are few amongst you who may not attribute your present unhappy position to one or other of the three misfortunes—Poverty, Ignorance and Drunkenness. Well, we may look upon Idleness as being the parent of these misfortunes. Beware then of the latter, and always bear in mind, that there is no greater obstacle in the way of success in life than trusting to something to turn up, instead of going to work and turning up something.

When you land in a strange country accept the first offer of employment which presents itself, no matter how humble the employment may be, provided it is not criminal. Do not remain with your arms folded waiting for something to turn up, which you think will suit you. No greater mistake, and for which many a foolish emigrant paid sorely when he found his pockets empty, "distressed on every side with no hand to help;" such has been the sad fate of many emigrants, but I hope you will be wise enough to avoid it. "Idleness travels very slowly, and Poverty soon overtakes her." The road to independence is not a very smooth one, especially in a new country; there are a great many big stones in the way which can only be removed by patience, perseverance and energy. The results of honest labor more

than compensate for its anxiety and difficulty. Exertion is the parent of Independence, and without the latter we are seldom happy.

Wages.—There is every encouragement given to the sober and industrious in New South Wales. The following is a list of the yearly wages, exclusive of board and lodging given to the working people.

Shepherds	..	..	£30
Ploughmen	..	..	35
Blacksmiths	..	..	50 to 60
Coachmen	..	..	40
Grooms	..	..	30
Cooks	}	..	20
Housemaids		..	
Laundresses &c.		..	

Education.—The next and last thing connected with the colony which I shall notice is the state of education there. Education is the poor man's best friend, and therefore any government having at heart the welfare of a people should provide ample means for their education. "I have no sympathy," writes a great and wise man, "whatever with those who would grudge our workmen and other common people the very highest acquisitions which their taste or their time, or their inclinations would lead them to realize; for, next to the salvation of their own souls, I certainly say that the object of my fondest aspirations is the moral and intellectual, and as a sure consequence of this, the economical, advancement of the working classes."

I need scarcely tell you, men, that these are my sentiments also.

Education—The national system of education in New South Wales may be said to have been introduced in 1836, by Sir Richard Bourke, governor of the colony at that time. He was not as successful as might be desired, yet his efforts to raise the moral tone of society in the colony have secured for him the affection of every good and well intentioned man.

Speaking of the importance of education to the people of New South Wales he said, "*I may without fear of contradiction assert, that in no part of the world is the general education of the people a more sacred or necessary duty of the government than in New South Wales.* It is worthy of notice that the Irish system of National Education should be selected as a model for the education of the poor in this, and I might say all other British Colonies; and well deserving of the honor that system is. National Education in Ireland has diffused its blessings far and wide over the country and sown the seeds of knowledge and enlightenment.*

This is not the place, however, to give expression to my feelings, or advance any opinion upon a system that has placed many a poor and friendless Irish lad beyond the reach of poverty and want, and led to the development of that genius and talent inherent in the Irish youth.

For myself I must say that were it not for that system, it is more than probable I should never have been able to fill an office amongst you of which I am proud.

My poor and humble education I received in a great University, and many a now learned man, drank from the same fountain of knowledge. My books of early study were the same as those from which I teach you night after night, and how I teach you, I was taught myself. The University to which I now allude, is one open to the child of every poor man—it is the Model National School in Marlborough-street.

Long may that school continue to shed the blessings of education amongst the children of the Irish metropolis.

* The Educational Works of Dr. Sullivan, written for the use of the Irish National Schools, are of more than European reputation, they hold the very highest place as class-books in America and in the British colonies.

And here let me accord to the good gentleman presiding over the administration of the system itself, the Right Hon. Alexander Macdonnell, the gratitude of one who admires his actions, respects his policy, and loves the man.

He has been to me, and to thousands like me, a wise adviser, and a kind friend. He is truly great, for he is truly good.

I have wandered too far, I fear, from the subject before us, but gratitude, "the memory of the heart," must plead my excuse.

The state of Education in New South Wales must indeed have been very low previous to 1836, when we find that in 1851, out of a population of nearly 188,000, not half that number could read and write, though there were in the colony the same year forty-three National Schools in operation, and fifty-three more in progress, exclusive of many other of a denominational class.

There is a beautiful statue of the great advocate of National Education, Sir Richard Bourke, erected in Sydney by the people of New South Wales, "to record his honest, able, and benevolent administration, from 1831 to 1837." Part of the inscription is as follows:—

"He established religious equality upon a just and firm basis, and sought to provide for all, without distinction of sect, a sound and adequate education."

He was a good man, and a wise governor, and under his administration New South Wales is said to have attained the highest state of prosperity. Port Jackson was crowded with shipping, bringing free laborers and capitalists, the banks overflowing with money, and the whole population full of the happiest excitement."

Besides Sydney there are many other important towns in the colony, of which Paramatta, Campbell Town, Liverpool, Windsor, and Wellington, form the principal.

I now conclude my observations for the present upon New South Wales, hoping that the information you have received, may prove interesting and instructive to you all. And should the day arrive, when by honest industry, and manly perseverance, you will have acquired the means of reaching its shores, remember what has been effected by those who have gone before you

—“Without a friend,

Pressed by a thousand foes.”

Yet they acquired independence, station and position, by honest labour, sobriety, and frugality; to you I say, “Go Forth and Do Likewise.”

LIFE:

ITS BATTLE, AND HOW TO FIGHT IT.

It is my intention on this evening to offer a few observations on the various stages of Life, its Battle and how to Fight It. The subject is one of interest to us all, and requires one more competent than I to treat it with that power which its importance demands.

Infancy.—The innocent and helpless stage of infancy is the earliest era in the life of man. Here for the first time, the affection and anxiety of a mother for her child, show themselves, whether that mother be Christian, slave, or savage.

In every clime the love of a mother shows itself, and it is beyond the powers of a child ever to fully compensate a mother's love, a mother's care, or a mother's anxiety. "When it wakes from its sleep there is one watchful form ever bent over its cradle. If startled by some unhappy dream, a guardian angel seems ever ready to soothe its fears. If cold, that ministering angel brings it warmth; if hungry, she feeds it, if happy, she caresses it. In joy or sorrow, in weal or woe, she is the first object of its thoughts. Her presence is Heaven. The mother is the deity of infancy."

Much indeed is due to a mother, and when we find her "tottering on the grave's cold brink" we should then think of all she has done for us, and endeavour to smooth her path to eternity by affection and obedience.

I have never yet known a good man who was not a good and affectionate son.

But many of you have had mothers whom you could

not consider good, and who perhaps by their bad example and evil instruction, are more or less accountable for your present position. If there be such amongst you, and your mothers still live, act you the part of good sons, and on your return to your homes impress upon their minds the words of our dear Lord and Master regarding bad example—"Better that a mill-stone should be tied round their necks, and cast into the sea, than scandalize one of these little ones." But take heed that you

"Speak gently to the aged one,
Grieve not the care-worn heart;
The Sands of Life are nearly run—
Let such in peace depart."

Boyhood.—After infancy, the next stage of life is boyhood, and generally speaking, as our infancy, so will be our boyhood.

To some of you the recollections of boyhood, its scenes and innocent amusements, must make you gloomy and sad.

Manhood is the next step from boyhood. The structure of man is perhaps the grandest miracle in nature. Placed as the head of creation, endowed with the greatest beauty and nobility of form, gifted with faculties which, if properly exercised and applied, enable him to claim relationship with angels, he is designed by God to rule over creation itself. Made to reflect God's own image; with form erect and countenances directed heavenwards, as if to remind him of the destiny awaiting him if his actions during his sojourn in this life entitle him to a place in his Maker's mansion.

The dignity and high position for which man was intended by the Almighty show themselves clearly and distinctly in the following passage:—

"And God said, let us make man to our image and likeness, and let him have dominion over the fishes of the

sea and the fowls of the air, and the beasts, and the whole earth, and every creeping creature that moveth upon the face of the earth."

What power is thus vested in man by his Creator. But God has done more for man. He has promised him a happier home beyond the grave than that which all earthly power, splendour and greatness, can obtain for us here—a home "where everlasting suns shed everlasting brightness."

But how different are the lives of men, how dreadful is the wickedness of some, how great the virtues of others.

The wicked and vicious man is never happy, no matter what may be his riches or power in this world. "The wicked man," says Job, "travaileth with pain all his days. A dreadful sound is in his ears; in prosperity the destroyer shall come upon him." The same inspired writer also says, that "his remembrance shall perish from the earth, and he shall have no name in the streets."

Men forget their dignity and the grand object of their existence when they indulge in those vices which make them more brutal than the very beasts of the field. It is ridiculous to hear the miscreant and the drunken sot speak of what freedom and liberty should be, while he himself is engulfed in slavery, and slavery too of the darkest dye—the slavery of his own vicious habits whose chains are forged by himself. Little does he know that

"The bravest trophy ever man obtained
Is that which o'er himself, himself hath gained."

Let me now tell you in the words of a wise and good man, what constitutes the true freedom of a man.

"The free man is he who is *loyal* to the laws of the universe; who in his heart sees and knows, across all contradictions, that injustice cannot befall him here; that except by sloth and cowardly falsity, evil is not possible here. The first symptom of such a man is not that he resists and

rebels, but that he obeys. Gladly he that will go gladly to his labour and his suffering, it is to him alone that the upper powers are favorable and field of time will yield fruit. The essence of all '*religion*' that was and that will be, is to make men *free*. Who is he that, in this life-pilgrimage, will consecrate himself, at all hazards, to obey God and God's servants, and to disobey the devil and his? With pious valour, this freeman walks through the roaring tumults, invincibly, the way whither he is bound."

Such a man indeed well deserves the name of *freeman*. It is not very easy, I know, for men such as you are to govern evil inclinations. Perhaps had you met some kind friend to advise and exhort you in earlier years your lot would be happier. But do not despond; there may yet remain the embers of goodly youth which require only to be kindled by the fire of repentance to shed brilliant rays of morality and religion, rays which will dispel the dark and heavy clouds of crime and despair, that for years have shrouded the nobler and more manly characteristics of your nature.

Arise then I say and burst those chains of slavery which you yourselves have forged. Let your reason predominate and ever keep subject those evil inclinations and vicious habits, the indulgence in which has made the dark frowning walls of a prison the barriers to your liberty, and its cells your cheerless homes for many a long and dreary year. Reflect—look back on the past, profit by its bitter experience, and manifest to those who with arms folded look doubtfully and suspiciously upon your reformation. Prove to them that within the bosom of an unfortunate and erring one there beats a grateful and a noble heart. Remember, men, that you are the living images of Him who, desirous to show his mercy and forgiveness for man, exclaimed to the penitent thief on Calvary's height, "This day shalt thou be with me in Paradise."

I shall now ask you to follow me while I offer a few remarks upon man's maturity, and his decline, two very important stages in human life. At the age of thirty, man may be considered in his prime and maturity, his physical powers being then at their maximum or greatest point—while at the age of fifty, he may be looked upon as entering upon life's decline.

Though not a very shrewd observer of mankind, yet it has frequently occurred to me, that it is in the power of every well disposed young man to better his condition in life before the era of maturity has arrived. Of course I do not presume to say that all young men can rise above the depressing circumstances of a poor or low birth, and soar to a high and dazzling position in the world, but I hold that it is in their power more or less to become useful and respectable members of society. And further, I hold that those young men who have received an early education, have very little to plead in self excuse, if in later years the effects of their early training are not visible to their advantage, and this is best seen by their character and reputation, no matter how humble their social rank. Well has it been said by a great poet, that "the child is the father of the man."

It is sad to see men preserve the evil passions of their nature for mature age, and then like some wild beast escaping from its den, prey upon society till overtaken by the strong hand of justice and committed to the prison cell, there to pass the prime of their existence shrouded in the degrading costume of a convict. By this time you must have felt the wearisomeness of such a life and learn that

"A prison is a house of care,
A place where none can thrive,
A touchstone true to try a friend,
A grave for one alive."

When each evening I glance around and see so many fine looking men in the full flush of existence, my bosom is filled

with emotions of pity and regret. To account why such men should sacrifice their liberty and their homes, and forget themselves to so deplorable an extent, as to become the outcasts of society, bearing, as many of *you* do, the impress of many crimes, is, I assure you, to me a task of difficulty and of sorrow; man "was not born to shame," it is man who brings shame and misery upon himself. Many of you may say that your sad position is attributable to various causes; doubtless it is, but the true and only cause is your own vicious conduct. Some will tell me they had bad and profligate parents, whose example set them in youth had its effect even in manhood. Now I must confess that I am not altogether a believer in this doctrine, for I am and ever have been of opinion, that no matter how bad or how demoralized a parent may be, it is in the power of a child when it arrives at mature age, to eradicate from its own heart, the evils which bad example and bad precept have sown there, and prepare the mind for the seeds of moral and religious instruction. My experience of mankind in every phase of life, confirms this opinion more and more, and in support of my views, I have the authority of the able man who wrote that "every man has two educations—that which is given to him, and the other that which he gives himself. Of the two kinds, the latter is by far the most valuable. Indeed all that is most worthy in a man he must work and conquer for himself. It is this that constitutes our real and best nourishment. What we are merely taught seldom nourishes the mind like that which we teach ourselves."

It was the education in vice which you gave yourselves, that brought you to what you are; but even now you can unlearn your follies, it is not yet too late. Let not past misfortunes subdue your courage, or stay your efforts to regain the position which you have lost. It was the want of moral courage that caused your fall. Many of you, I

know, committed crimes for the purpose of being considered daring and courageous, though you well knew in your hearts you were doing wrong. But my advice to you is, for the future, to avoid what is wrong, and to do what is right, regardless of the opinions, frowns, or smiles of any, whether friend or foe. Do this and you will never bring yourselves into danger, and thus you will save your hearts from many a pang, and remorse of conscience can never disturb your slumbers.

If you are disposed to profit by the advice I now give you, it is not too late. Every hour that passes over you may be turned to good account in uprooting those habits for which you have suffered. And here let me impress upon your minds that the longer you defer entering upon an honest and industrious career, the more hopeless will be your reformation. Commence then at once, and ever look upon the phrase *too late*, as the curse of life.

I am now about to address the old men amongst you. A few short years hence and these languid eyes will be closed in death, and your fast failing frames will moulder into earth once more. You now stand in the shadow of death,—you are now in the winter of mortality—hopes and fears, sighs and farewells, joys and sorrows, will soon no longer affect you. It is time then to awake and look forward to your future state. God is merciful. He is just. The past can never return; therefore it behoves you to “wisely improve the present—it is thine, go forth to meet the shadowy future without fear, and with a manly heart.” Here let me remark to both old and young, that to defer preparation for the death-bed but too often proves too late—it is a very poor support, I fear, for the parting spirit to depend upon.

“Fool! fool! fool!” were the last words of one, on his dying bed, who, it is to be feared, had procrastinated his repentance too long, and too fearfully; while the humble

Christian, sensible of a thousand failings and imperfections, still looks with the eye of faith on his Redeemer; and his soul, like the flight of an eagle, towards the heavens, soars to the regions of everlasting happiness.

May ours be the death of the humble Christian.

I now conclude my remarks upon the various stages of life. Life is a divine gift, and it is in the power of every man to make that gift conducive to honour or to shame. How it can be spent to make shame its inevitable consequence you all know; how it can be spent to render a man honourable and independent in this world, we shall now see.

It has been said that "if you begin life with disappointment, it is apt to end in despair." Now I would say, when disappointment presents itself, step over it. Disappointments should rather tend to stimulate your exertions than unfix your determinations. And these obstacles which disappointments place in our path, try us as to our energy, ability, and steadfastness, and if we surmount these, we prove what is called the "use of difficulty."

There are many qualifications which a man determined to succeed in this world must possess. Amongst them I shall first notice industry, as it is the prime source whence spring fortune and independence.

Industry is, and ever has been, the great means by which we open a way to wealth and honorable independence, whilst religion and honesty furnish the only safe lights to guide us on the journey. Before starting upon the journey of life, then, you must first resolve to be industrious, and make up your minds to overcome by patience, perseverance and zeal, the difficulties to be encountered. No half measures will do—if you be idle to-day and industrious to-morrow, you can never expect to reap the golden harvest of honest labor. Obstacles and disappointments you must be prepared to meet, the path you are proceeding on is beset with them,

but when they do occur, be neither disheartened nor discouraged; let them rather stimulate you to more vigorous exertions, for to the man who is determined to accomplish the object he has in view, particularly when that object is a laudable one, there is no difficulty insurmountable. You are sure to pass by in your progress, thousands in poverty and want—stragglers by the way side—who may sneer at your labors, and set you down as a fool for your pains; but to those you must say—we will argue this point with you, on our return, when the pilgrimage of our life is ended; for the present we can only spare time to bid you farewell.

Life's Battle must be fought by every man, rich and poor. Some fight it and are defeated, others fight it and are successful. Amongst the former we find the idle and irresolute, among the latter the industrious and persevering. Industry turns all it touches into gold—it is the great fortress that resists the besieger, Want. It is the bark which rides out triumphant above the raging winds of poverty, and preserves the owner safe and secure, while his enemies pay homage to him, as they look upon and admire or envy, what they call his good luck, but what I believe to be the reward of honesty, self denial and ever wakeful energy.

The law of Industry is a law nearly as old as the world itself, established by the Creator when he said to Adam, “out of the sweat of thy face shalt thou eat bread.”—a law wisely and mercifully established for the good of all mankind.

I never approve the sentiments of those who say, when speaking of one who has succeeded better in life than themselves, “he was a lucky fellow, but what would he be had he not had friends to take him by the hand.” “I remember him,” another will say, “when he was so and so.” A third will say, “there was a time when I would not condescend to know the fellow,” and thus they continue. Now, my friends, the industrious and persevering man, heeds not

such remarks as these, for he knows they all proceed from jealousy, and I regret to say envy in many instances is at the bottom of them. An anecdote which happened to come under my notice at one time, is very applicable here, as it shows the cause of the industrious man's success. Richard Burke, being found in a reverie shortly after an extraordinary display of powers in Parliament, by his brother Edmund Burke, (Edmund Burke I should tell you was a great Irishman, a great orator, a great writer, one, perhaps, of the greatest men that ever sat in the House of Commons), was questioned by a friend as to the cause, and replied, "I have been wondering how Ned has contrived to monopolize all the talents of the family; but then again, I remember when we were at play, he was at work."

Thus it is that the industrious man by perseverance rises to independence and fame. His business is his recreation, its study his pleasure. It has been very wisely observed, that "a man who gives his children habits of industry, provides for them better than by giving them a fortune." Equally true the saying, "At the working man's house hunger looks in, but dares not enter; nor will the bailiff or the constable enter; for industry pays debts, but despair increaseth them."

Treasure these sayings, let them ever live in your memories so that you may remember them when fighting Life's Battle.

Your position now, my friends, is sad and gloomy, but it will not long continue so please God. Liberty you soon shall have, and no doubt you will value it, and the best way you can prove that you do value it, is to enjoy it. You all know by this time that

"When liberty is gone,

Life grows insipid and has lost its relish."

With the prospect of liberty before you, you should not

despond nor allow your present state to enfeeble your determinations, or prevent you from making every effort to regain the happier one from which you fell. This can only be done by honest and persevering industry. God has wisely designed that all men should labour, and "if any man work not, neither should he eat."

But some of us are apt to imagine that unless a man is stripped in his shirt sleeves, and hard and heavy at work, he is not *labouring*, and hence it is many of you suppose that men who wear fine clothes, have grand houses, splendid carriages and many servants, do not labor at all. Such an opinion is very erroneous indeed. Labor is of two kinds, that of the hands or manual labour, and that of the mind or mental labor; the latter is by far the more oppressive, the more wearing, and the more laborious. Riches do not always bring contentment and happiness with them, nor do great and high situations in this world confer upon those who fill them that amount of pleasure and delight which such men as you are inclined to suppose.

You cannot, I fear, form an adequate notion of the mental labor, mental pain, and mental anxiety of some great men. They feel the heavy responsibility of their office—their actions are watched, nay the very words they speak are noted down, and they are always on their trial before the bar of public opinion. Should the plans devised by them for the public good or for the advantage of the kingdom fail, the world condemns them, no matter how well meaning or how good their intentions. Thus it is that great men seldom experience that repose and content of mind which the honest poor enjoy. But it is right I should tell you who in my estimation is entitled to the name GREAT MAN. He who devotes his life, his talents and his genius in ameliorating or bettering the condition of his fellow-man. I do not esteem that man great, whose yearly income may be counted

by thousands and hundreds of thousands, and who spends it in indulging in pleasure and in folly, regardless of the wants, the penury and the privations of his fellows. No, nor would I envy such a man's pomp, riches or wealth. "Nothing can make a man truly great but being truly good, and partaking of God's holiness." When it is your happy fortune to meet a GREAT MAN, that is a man raised above you by station, birth, education and fortune, and who forgetful of all these advantages over you, stoops to heal your wounds and wipe away your tears, respect him and feel grateful. Gratitude is the only tribute we can pay to such men; they deserve it at our hands; the grateful memory of such men is a pleasure to those who can feel that, "It is a species of agreeable servitude to be under an obligation to those we esteem."

I would also have you to be very cautious in condemning the acts of great men; you can only see the surface of affairs, while they have penetrated the depths.

I cannot give you a better idea of what a truly great man is than is given by a great man himself. "A great man is affable in his converse, generous in his temper, and immovable in what he has maturely resolved upon; and as prosperity does not make him haughty and imperious, so neither does adversity sink him into meanness and dejection, for if ever he shows more spirit than ordinary, it is when he is ill-used and the world frowns upon him; in that he is equally removed from the extremes of servility and pride, and scorns either to trample upon a worm, or sneak to an emperor."

There are few who would not respect and esteem a man so gifted, but unfortunately you have never been taught to do thus. GREAT MEN have ever been looked upon by many of you as so many foes, and the government of which they may form a part you were but too easily led to disrespect.

Industry, whether bodily or mental, can only make us great provided it is industry based upon morality and religion, having for its object the elevation of the mind as well as the comfort of the body. And, thank God, great men are not confined to the ranks of the noble and the wealthy, but as the pearl is found in the oyster shell and admired for its unsullied whiteness, so from amongst the friendless, the poor and the lowly have great men sprung, whose names shall be honored and their memories revered.

The humblest being born is great,
 If true to his degree,
 His virtue illustrates his fate
 Whatever that may be—
 Thus let us daily learn to love
 Simplicity and worth ;
 For not the eagle but the dove
 Brought peace unto the earth !

So much for industry and what it may effect. The law of labor is divine, a legacy left us by old father Adam—a law which has ever since been obeyed by every good man. Labor is food and physic for the body; then let us face it with earnestness of heart and gladness of will, never despair, and as we face the struggles of life remember the advice of the poet—

Work, work, my boy, be not afraid,
 Look labor boldly in the face ;
 Take up the hammer, or the spade,
 And blush not for your humble place.

There's glory in the shuttle's song,
 There's triumph in the anvil's stroke,
 There's merit in the brave and strong,
 Who dig the mine or fell the oak.

But industry alone does not do. Temperance and frugality are indispensable to success and independence in this world. We all know how true and expressive the adage—

“there is little good in the cow that yields a pail of milk, and then spills it.” Equally absurd is the conduct of the man, who in the evening squanders in low debauchery in some filthy tavern, the good wages he obtains by the labours of the day. You are all aware of the number of excellent tradesmen who pursue this course; you are also aware of the consequences that result from it—themselves, and their families are always wretched and miserable,—their clothes shabby, patched and ragged, their meals scanty and uncomfortable, and their dwellings, which are to be found in foulest and unhealthiest localities, cheerless and disgustingly dirty.

Thus you see that without these invaluable accompaniments, Temperance and Frugality, Industry may become more productive of evil than good, for wherever intemperance and the vices of which it is the fruitful parent prevail, domestic comforts must be always strangers.

Temperance preserves health and keeps man's reasoning powers clear. Besides this there is a blessing attending the sober temperate man. As I have already spoken to you on this subject, I shall only say to you, cultivate temperance for the future, and blessings and virtues will more than compensate you for your trouble. Further, I wish to impress upon you the great necessity that men like you should be frugal—men who I may say are friendless—men most likely to meet with coldness and indifference in the world—to such men I say, a shilling or sixpence, nay even a farthing, is valuable indeed. No matter how great the pleasures the good things of this world afford, they bring with them poison and remorse, when we feel that in procuring them, we are exceeding our earnings, or depriving ourselves of necessities, whilst indulging in superfluous luxuries. Think of this then, and do not squander your little earnings even in this Institution. Do not permit

over sanguine expectation of success when discharged from Smithfield, lead you to think lightly of what you are now earning. Hope is a pleasant acquaintance, but an unsafe friend. Be frugal therefore and save while you can, and believe me when you again find yourself in Life's Battle Field, you will find that your most powerful friend and ally is Prudence. "Frugality," says Doctor Johnson, "may be termed the daughter of prudence, the sister of temperance and the parent of liberty. He that is extravagant will quickly become poor, and poverty will enforce dependence, and invite corruption."

I have already told you that you would be exposed to the ridicule and jeerings of idlers in your onward progress, and much it is to be regretted that contempt and ridicule should furnish such effective means for shaming the weak and wavering from the path which is certain to conduct them to happiness; and rogues and fools should exercise so fatal an influence in trying the courage and resolution of the honest and the well-disposed. To sustain with firmness and composure the jeers and taunts of those who would revile virtuous undertakings, shows a man to be possessed of a noble nature and decision of character, which latter quality endows an individual with a moral power that is generally regarded as the first element of greatness. Now listen, while I endeavour to impress on your minds the means by which you may be able successfully to combat the wicked efforts of the scoffers, who would fain turn you away from your honest purpose, and make you victims of the ruin, that is certain to overtake themselves.

You must first remember that it is ordained by a wise Providence that you should be constantly exposed to temptations and trials; it is quite natural then to expect that you should encounter them more frequently in your resolutions to proceed on a career of virtue and goodness. But

then, if that great and good Being who has ordered all things for the best, has thought fit to expose you to temptations, he has also mercifully provided the means by which you can effectually resist them, for he never denies his all-sustaining grace to those who sincerely implore it, and if you but keep constantly in memory the sufferings and sorrows of him whom he sent down from Heaven for your sake, you will be enabled to bear patiently and firmly any annoyance or persecution you may meet with at the hands of the ill-disposed. Remember " 'tis one thing to be tempted, another thing to fall."

Armed thus you may boldly encounter Life's struggles, and heroically fight its Battle. The derisive smile or scornful laugh of the idlers will have no sting for you, you can well afford to leave them to the enjoyment of their mirth; they may pronounce you a fool, but time and the substantial rewards which are sure to crown your efforts, will perhaps cause them to alter their opinion, or at least turn the laugh in your favor. There is an old and a true proverb which says that "Those who Win may Laugh." In a short time these petty annoyances are certain to cease, for the tormentor soon grows tired of his employment when he perceives that his ridicule is received with its merited contempt. But this complete indifference to the ridicule, combined occasionally with the solicitations of men whose acts you once approved, in whose guilt you were perhaps frequent participators—this steadiness of purpose now so essential to you, and without which the pure and the innocent are not secure from the wiles of the tempter, you cannot, I fear, hope to acquire without decision of character; this, I repeat, is the quality that most contributes to independence here, and by the support it lends to religion, may be said also to lead to eternal happiness hereafter. View it in any point, temporal or eternal, moral or physical, decision of

character appears quite indispensable; where this grand attribute prevails, threats and solicitations fail alike to divert a man from what he considers the line of duty. Did the terrors of the lion's den affect the decided character of Daniel, or the flames of the furnace that of his intrepid companions? What, in short, bids the martyr brave the block—the patriot the dungeon, or the soldier the cannon's mouth, but decision of character—decision of character, I repeat, with the value of which you can never be too deeply impressed.

In conclusion, I would earnestly advise you to place no trust in those who affect an extraordinary friendship for you, who desire to persuade you that they are your bosom friends, and that they feel a stronger interest in your welfare than their own; however plausible and sincere they appear, suspect them I say, question their motives—examine them narrowly—and you will be sure to discover that they but want to render you the instrument of some evil design—to use you for their own advantage, and when they have effected their purpose to abandon you to the consequences. Recollect that it is want of decision of character that has led to the commission of the misdeeds the penalty of which you are now suffering in this prison—a penalty which, I am sure, must be increased sevenfold by the knowledge which in your hours of reflection, must force itself upon you, of the shame and the sorrow that some of you have brought to the doors of honest and affectionate parents who carefully watched over the years of your infancy, of the tears that others of you by your crimes may have wrung from the eyes of your devoted brothers and sisters, and the misery and distress which must now be the portion of the wives and offspring of such of you as contracted those ties, unmindful of the duties you thereby imposed upon yourselves. Let the experience of the past teach you to be

wiser for the future; use every precaution to baffle the tempter, close every avenue against his approach—drive him from you at once, for his presence, if but for ever so short a time, may blight all your fine resolutions and poison your happiness for ever. Do not for a moment hesitate as to how you are to rid yourself of him—there is danger in hesitation—there must be no false modesty—no fear of the severity of his retorts, there must be determination in your tone and in your look. As an illustration of my meaning I will quote four simple lines which you will do well to remember.

“ Gently stroke an angry nettle,
 And it stings you for your pains ;
 Grasp it, like a man of mettle,
 Soft as silk it then remains.”

Profit, I say, by your past experience. Carefully avoid the places, the society, the pastimes that led to your first fall into guilt. Enter hand and heart on the road to Industry, which is only another name for the road to Wealth; no proverb contains more truth than that which says that ‘time is money, and industry a treasure.’ Forget for ever your former vicious habits, for so sure as you yield to the indulgence of the least objectionable of them, so surely will you again fall into crime, to be followed by that punishment of which you have already experience, and to be followed hereafter by a punishment as terrible, as it will be eternal.

And this you will find it easy to do, if you are only attentive to the precepts of religion; neglect of these precepts leads to ruin, while the man who is eager to acquire a knowledge of them, will not only learn to repent of former transgressions, but thoroughly fortify himself against future temptations.

Thus, men, may you hope to fight Life’s Battle bravely and manfully, and at its close you may look with a Christian’s hope to Heaven, and there expect to enjoy “perfect

purity, everlasting freedom," and perfect rest. It was beautifully said by the author of a great good book, "The Following of Christ," when writing of a virtuous man, "some there are who keep themselves in peace, and have peace also with others, and there are some who neither have peace themselves, nor leave others in peace; they are troublesome to others, and still more troublesome to themselves.

"And there are those who keep themselves in peace, and study to restore peace to others.

"Nevertheless all our peace in this miserable life must be placed rather in humble endurance, than not in experiencing opposition.

"He who but knows how to endure, will possess the greater peace.

"SUCH A MAN IS CONQUEROR OF HIMSELF, AND LORD OF THE WORLD, A FRIEND OF CHRIST, AND AN HEIR OF HEAVEN."

Note on this Lecture.

To some reading this lecture, it may appear to be a lay sermon rather than such a lecture as properly belongs to my course. I give it, however, as a specimen of some lectures addressed by me to the men at Smithfield, at the special request of the men themselves. I have always thought it right to address them upon any subject in which they appeared specially interested, (excluding always, of course, religious subjects within the scope of the chaplain's duty.)

When the men desire to be spoken to upon moral or social subjects, it is a good sign that the heart is awakening. It is true, doubtless, that they have all been vicious, but there is a grand moral in the Redeemer's rebuke to those who would have stoned the woman taken in adultery; and besides, though we know that those men have been guilty of crimes, though all can tell their sins committed, which of us can tell the temptations surmounted? For my part, I have always looked and shall always look for what I believe the perfection of reformation in a convict, a desire to talk upon his moral future.

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