
Lim est
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Inter
rupt ions

# Lim est one interruptions

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*Contents:*

# *Marjan*

*When we came abroad, aboard this land, stepped down from the plane into its climate and onto its ground, the first experiences we had were of its utter intractability - very stony, a steep path through dense pines, and such, so much, greater altitudes and gradients. We were walking our feet, on new ground, gingerly, in fear of falling. Testing words in our mouth. A vast slippery fish. I, for one, cannot touch it or imagine ever carrying it in my arms. The land, the stones, sharp, fraught with obstacles and detours. Now, within a few days, I start to test and taste the words and sounds upon my tongue - Obilazak. I cannot speak. I am learning to walk.*

By far the larger proportion of the surface rocks of the world have been formed by the agency of water, chiefly as a fluid, but partly as ice. Such rocks are made of sediments, and these sediments have been, and still are, chiefly the result of the action of atmospheric agencies, aided by chemical solutions, and of gravitation, aided by moving water. But by what special processes were they formed? Air and water, but especially the latter, act both chemically and mechanically on the crust of the earth.

*(Who is this character, who is he? She? Can she be a man, can she be third person? Can they be plural, male and female, shifting please? Why are they here/there? Can I multiply and be "we"? Can we have a back story? A front story, a future? Do we need to know?)*

Many minerals in rocks, such as felspars, hornblendic minerals, mica, are composed of

silicates of aluminium and soda, potash, lime and magnesia. These are often associated with free silica. This is especially the case with some igneous rocks; and many of the stratified rocks consist in great part of substances of the same nature variously intermixed. Others consist of carbonate and sulphate of lime, more or less pure. Of these, the carbonate of lime rocks, or common limestones, by far predominate; and they are sometimes nearly pure, forming immense areas of country, and sometimes mechanically intermingling, in every percentage, with other substances.

*Already, we are becoming amphibian, the ability to slip into the sea at the drop of a hat. Getting into water is like slipping into oneself, into aloneness, into time. Doing our work, filming under the sea, exacerbates this sense of separation and embrace.*

All rain as it falls absorbs part of the carbonic acid in the air; and the water percolating through the rocks unites with and carries away in solution portions of the soda, potash, lime, or magnesia that enter into the composition of the minerals in rocks, and this promotes their dis-integration. They crumble, and are in a condition to be borne to lower levels, and finally to the sea, by the mechanical agency of running water, or partly in solution.

*As my face and body change - erode, dissolve, calcify, cheekbones becoming more prominent, eyes sinking as if the underlying rock has melted, skin wrinkling into ridges, minute layers being removed, a general dehydration*



*occurring, elasticity performing itself to death as less so - the face of the land mass erodes, sinking over millions of years into the submerging liquidity of the sea. Salt deposits, dissolving stones, shells, trees, sand particles, making and unmaking.*

Frost is also a powerful disintegrator. Water percolates into hollows, joints, and cracks; it freezes and expands, and thus helps to rend and break up the rocky and earthy masses. Some of its most obviously powerful effects are seen in the regions of glaciers and drift ice. In warm latitudes glaciers are found only at those great elevations on mountain ranges that rise above the limits of perpetual snow. In cold climates, where special glaciers descend to the sea, bergs break off, often laden with blocks and finer sediments, and floating seaward they deposit their freights where they chance to melt.

*There are several walks. From the city through what is known locally as Marjan park-forest. I notice it was established with a public infrastructure in 1964. This is the year before I was born. I explore the space of this park-forest whose terrain, like a blanket of wildness, covers the eastern peninsula of the city. I am seeing a high rocky hill about four kilometres long consisting of prickly pears, whose thorns I find embedded in my skin, alongside what look familiar as Scots pines and numerous trees I do not know the names of, southern species obviously, with many small feathery leaves. Also, gigantic aloe vera plants, or perhaps they're called agave, enormous spikes of*

*glaucous green with stiff points. The locals, or it could be the tourists, have carved their names in some of these leaf-spikes near the start of the walk. It is hot, arid.*

The breaking up of the ice foot on sea coasts, and of river ice, also transports large quantities of matter and scatters it abroad. The quantity of material degraded and spread in the sea by these united means is immense, and consists of mud, sand, gravel, and rounded, sub-angular, and angular blocks, often polished, grooved, and scratched; and from the irregular mode of its accumulation, and the frequent grounding and scraping of icebergs along the sea-bottom, the whole of this matter, if exposed, would present one of the rudest forms of stratification.

*Unlike the walks I took in the very first days - where I was seemingly neutral, learning, watching, listening, observing intently in detail this absolutely unseen and unknown extra-terrestrial surface - these walks resonate for days. My emotional energy is a large ingredient, my veins are coursing with it. Objectivity, subjectivity, passivity, a studious gaze even - all are out of the question.*

But the chief agent in the transportation of sediments from higher to lower levels is running water. Great thunderstorms, water-spouts, and sudden thaws in snow-covered lands, frequently produce startling effects, stripping large areas bare of soil, and hurrying to lower levels vast masses of earth, shingle, and boulders.

*The period of arrival - the first time ever I saw your face, rock face, Karst cliff face -*



*is irreplaceable. So, when the shock of the unknown has retreated, I am left with ourselves. You can run but you can't hide. You can not leave your self behind. In fact your selves have a wonderful time on solo trips, growing, multiplying, kaleidoscopically mirroring on a minute by minute basis, into a glorious and monstrous being. And this being is both foreign and a part of ourselves.*

All rain, especially if long continued, exercises a powerful mechanical effect on the surface of the earth, carrying much sediment into watercourses, which unite to form brooks, rivulets, and finally, if the country be large, great rivers.

*I walk and think and do not talk. I'm getting to know myself. My mind is variously excited, lively, vital, tired, depressed, sluggish, forgetful.*

Soft surface soil is thus easily carried away even in low countries, and in hilly and mountainous regions, sands, coarse rounded gravels, and boulders, won from the adjoining rocks, are harried onward; and thus it happens, that great valleys and ravines have often been formed in all parts of the world by running water, and by the long-continued attrition of stones driven onward by torrents over rocky surfaces.

*Languages flow around, float above. I am submerged in this space. It is an interior cavity, a vast cave, a Wookey Hole, dripping, glistening, glinting, various overhanging points, dark in several directions, terrifying, beautiful, otherworldly. Ghosts haunt the mind, a cave of shadows, this cavern, in a parallax with the self image of a person - body face hair clothes*

*rucksack shoes - in the foreground of mists from this central subterranean lake. Friends, lovers, family, children, float up out of the water, come and go. To caress or to knife. It's a to-ing and fro-ing between interior and exterior that fuels a massive car-journey type introspection. A lengthy and detailed inspection. Looking out once more, after a long absence, what is found is rusty, creaky, dusty, cracked and the exit difficult to prise open.*

As the accumulated waters of rivers reach low lands, their power of transporting coarse sediment decreases, and finally, in great rivers, all but the finest sediment is deposited long before they reach the sea.

*I am in danger of ceasing.*

Every river, in fact, carries sediment and impurities of various kinds in suspension or held in solution, and this matter, having been derived from the waste of the lands through which rivers flow, is carried to lower levels. Thus it happens that when rivers empty themselves into lakes - or, what is far more frequently the case, into the sea - the sediments which they hold in suspension are deposited at the bottom, and, constantly increasing, they gradually form accumulations of more or less thickness, generally arranged in beds, or, as geologists usually term them, in strata.

*The walk. My already vulnerable frame of mind has had a bad shock via a letter this morning. I hope to recover, by choosing a destination, making a plan, and going out. As I leave the apartment, which is in a house located by the*



*palace, I feel that I am literally in pieces. Head awry, arms in front of legs, feet off centre, torso far behind. The mind, that was framed, is now scattered into the distant past, smashed glass lying about on the ground. A needling in the heart. I cannot speak and I thank heaven for anonymity.*

Suppose a river flowing into the sea. It carries sediment in suspension, and a layer will fall over a part of the sea-bottom, the coarser and heavier particles near the shore, while the lighter and finer matter will often be carried out by the current and deposited further off. Then another layer of sediment may be deposited on the top, and another, and another, until, in the course of time, a vast accumulation of strata may be produced.

*This walk takes me on it. There are sunny hot pavements, shops. I am not really in control and soon find myself, unwillingly, unwittingly, standing at the taxi rank. Then, I am shoving my two bags onto the front seat of a taxi and getting in next to a tall grey-haired driver. "Do you speak English?" He nods. I ask him if he can also pick me up in a few hours from the bit of coast I am aiming for, the Maritime Institute, and he says, "I would, but, I have been married for twenty years, today is our wedding anniversary and I am going out for dinner with my wife at 4 o'clock". We sit in silence as he drives the long way, through the tunnel. I am aware of my solitary condition - no husband, children, dog. Something has broken/failed/is gone, like an unanswered question - a pocket of*

*oil*.

Again, if we examine sea-cliffs that rise direct from the shore, we find that the disintegrating effect of the weather produces frequent débâcles great or small on the faces of the cliffs, thus supplying material for the formation of shingle, which in gales the strong breakers driving against the cliff forms a 'powerful artillery with which the ocean assails the bulwarks of the land' and aids in the work of destruction.

*As we travel underground I remember a previous walk on the peninsula. I had been using the satellite navigation on my mobile phone. I'd spent a nervous hour in the falling dusk looking for a right turn onto a main road. Walking up and down a back lane, the way had simply refused to materialise. On the satellite map it promised to take me towards the city centre. In rapid dusk, and in a final act of desperation I had taken my glasses off, and only then spotted an illegible, tiny font naming this supposed main road as the _____Tunnel. The tunnel which now reassuringly embraces me in the false night of a sodium glow. I had been hunting for the hidden all along. I'd felt again that wave of relief that I was not lost, and had not lost my mind. I'd then found and trusted an alternative route which had led me triumphantly on, into the welcoming darkness and lights of the city.*

On the east and south of England, where the strata largely consist of boulder-clay, Eocene clays, chalk, and oolitic sands, clays and limestones, the waste of the softer strata has been in many places



calculated at about two yards a year. Where the strata are harder, as on the west coast in Devon, Cornwall, and Wales, the waste is often so slow as to be generally ignored by ordinary observers. But the form of the coast proves it. Hard rocks resisting waste because of their hardness are apt to form headlands, while softer or more friable strata, wasting more rapidly often occupy the recesses of coves and bays. The removal of the fallen detritus by the restless waters makes room for further slips of debris from above, and thus it happens that all sea-cliffs are in a state of constant recession, comparatively quick when made of clay or other soft strata, and when the rocks are harder, perhaps very slowly, but still sensibly to the observant eye, so that in time, be they ever so hard, they get worn more and more backwards.

*The taxi driver drops me off. It feels like the end of the road, the tip of the peninsula, it is the middle of the day. Not many people about. Hot pines and the filmy sound of insects. I try to look like I know where I'm going, as I walk down the steps that are next to the sign saying Maritime Institute. There is a definite red arrow going horizontally from left to right and then curving down and straight again from right to left.*

The material derived from this waste when sea-cliffs are truly rocky, generally forms, in the first instance, shingle at their bases, as, for example, with the pebbles of flint formed by waste of the chalk which contains them. These, being attacked by the waves, are rolled incessantly backwards

and forwards, as everyone who has walked much by the sea must have noticed; for, when a large wave breaks upon the shore, it carries the shingle forward, rolling the fragments one over the other, and in the same way they recede with the retreating wave with a rattling sound. As in the running water of torrents, so this long - continued marine action has the effect of grinding angular fragments into rounded pebbles; and, in the course of time, large quantities of loose gravel have thus been formed. Such material when consolidated becomes a conglomerate.

*The steps though, took me disconcertingly into a private garden, washing hanging on a line, chairs and table, a patio. I turn back, reverse, almost blushing. I try several promising looking gateways like this, but they are all domestic gardens. The clues - a wheelbarrow, an orange plastic basket, some logs.*

If, also, we examine with a lens the sand of the sea-shore, we shall find that it is formed of innumerable grains of quartz, and these grains are generally not angular, but more or less rounded: their edges having been worn off by the action of waves and tides moving them backwards and forwards upon each other, till they became grains, like water-worn pebbles in shape, only much smaller. Such material, when consolidated, forms sandstone. Finer-grained and more muddy deposits, in like manner, are generally formed of the minutest grains of sand, mixed with aluminous substances originally derived from the waste perhaps of felspathic rocks. Such material, when soft, forms clay;



when consolidated, marl shale and slate. Strata are consolidated (petrified) chiefly by pressure and chemical decomposition and recomposition. Some formations are many thousands of feet in thickness. Intense pressures have taken place throughout all but the very latest geological epochs This kind of pressure has been brought about by contraction of the crust of the earth due to radiation of the proper heat of our globe into space, the result being, that over broad areas rocky masses have been much contorted and compressed, and thus mountain ranges have been upheaved.

*Now I find I'm at a more imposing gateway and I am entering - and confidently taking the elegant stone steps all the way down the steep slope to another gate, this one wrought iron, fancy, and as it turns out, the gate of the Institute itself. It's a nineteenth century building on the water's edge. A seductive sandstone ramp descends into the crystal blue, sky-reflecting sea. I envisage myself walking down the stone paving, submerging my body, my hair flowing cinematically into the sea.*

In some rocks the particles are partly cemented by oxides of iron, in others by carbonate of lime. Minor beds of limestone are often formed on land from calcareous springs. Marine strata, formed of limestone, in the Adriatic, were found to be consolidated a foot beneath the surface. A great many rocks contain more or less carbonate of lime, and along with this, or alone, many others contain silicates of soda or potash. These are soluble in carbonic acid, and entering into

new combinations the whole becomes petrified.
*I multiply. We feel grand, we are someone who lives in houses, chateaux, palazzi. As sure as if we were in this film, we have arrived.*
During these processes shells, echini, corals, bones, teeth, and scales of fish and of marine mammals, are imbedded and cased in stone, and in a less degree terrestrial plants and animals are floated into lakes and estuaries, and out to sea, where those parts that escape decay and predaceous fish may become fossilised. If we examine the stratified rocks that form the land,we very soon discover that a large proportion of them are arranged in thin layers or thicker bands or beds of shale, sandstone, conglomerate, and limestone, more or less pure; for shales are sometimes sandy, sandstones sometimes shaly, and most conglomerates have a sandy and sometimes a shaly or marly base in which the pebbles are embedded, while limestones occur of every degree of impurity. These must have been formed in a manner analogous to that which I have just described, proving that such beds have been deposited as sediments from water. Take, for instance, a possible cliff by the sea-shore, and we shall perhaps find that it is made of strata, which may be horizontal, or inclined, or even bent and contorted into every conceivable variety of form.
*A young woman, dressed in jeans and anorak, comes out through the gate and pointedly closes it tight, it's a satisfying click, before turning to me and saying, "Yes?" "Is this the institute?" "Yes". "Can I come in? I have come here to do*



*the underwater filming". "No". "Oh... we were told we could swim here by a friend…". "Swim? aah, yes, then you are in the wrong spot. You need to retrace your steps up the hill. Then go to that sign that I think is about rubbish collection or parking. You will see some steps there. You will find them, do not worry". "No", she agrees, a little friendlier now,"it is not well signed".*
We take a particular bed, we may find that it consists of strata of limestone lying one upon the top of another may be of shale, arranged in thin layers, more regularly and may consist of pebbly materials, arranged in ruder layers, for, the material being coarse, the bedding may be irregular, or even quite indistinct. Then, we may have a mass of sandstone, arranged in definite beds. The whole of these various strata in the aggregate form one cliff.
*I soon find out why. You can tell they want to keep it quite private. The steps lead down further to a path running along but just below a series of houses and gardens and on the far side of the path is the sea. Nice place to live I think, but half heartedly, I mean it is very picturesque but it is also somehow weird, suburban and forbidden, not exactly welcoming. I guess that, as an alienated being, all I want is a warm welcome. And it's got to be said, that here this is not always forthcoming. A symptom of the underlying horror at the incoming tide of people - wakes and trails of liners and planes constantly cutting the blue - something like a veil colours many of the local residents faces when they see me. (Later I wonder, is there a*

*different veil, to do with the specific history of this place, a kind of ideological fundament? Is it a socialist empathy or a pity for other people less lucky and not from here?) Your best strategy is to fit in and look like you're a resident, easy for me as I'm good at pretending, having grown up under a policy of benign neglect in one of the largest cities on earth. Pretend to pretend you belong, and don't look like a visitor, and then the volume of the locals seething glares are turned down - ideally they don't notice you at all.*

Rocks, more or less of these kinds, compose the bulk of the strata of the British Islands; and it must be remembered that these were originally loose stratified sediments, piled on each other often to enormous thicknesses, and subsequently consolidated by pressure and chemical action. In some cases after consolidation, they have been so altered by heat and other agents of metamorphism, as to have lost almost all signs of their original stratification, while sometimes they are almost undisturbed, except by mere upheaval above the sea: in other cases the beds have been violently contorted. Some formations, such as great part of the Silurian rocks of Wales and its neighbourhood, consist essentially of deposits that were originally marine mud and sand, accumulated bed upon bed, intercalated here and there with strata of limestone, the whole being many thousands of feet in thickness. These have since been hardened into rock. Others, like the Old Red Sandstone, were originally spread out in alternating beds of mud, sand, and stony banks,



all coloured red by precipitation of peroxide of iron. Others, like the Liassic and Oolitic deposits, were formed of alternating strata of clay, sand, and limestone; while others, like the greater masses of the Carboniferous Limestone and the Chalk, were formed almost wholly of carbonate of lime. When we examine such rocks in detail, we often find that they contain fossils of various kinds-shells, corals, sea-urchins, crustaceans, such as crabs and trilobites, the bones, teeth, and scales of fishes, land plants, and more rarely the bones of terrestrial animals. For instance, in the bed of sandstone, we might find that there are remains of sea shells; occasionally - but more rarely - similar bodies might occur in the conglomerate, frequently they might lie between the thin layers of shale; and it is equally common to find large quantities of shells, corals, sea-urchins, encrinites, and various other forms of life in such limestones which, in many cases, are almost wholly composed of entire or broken shells and other marine organic remains.

*I remember times in life when not much was said, silence reigned - a too long relationship, a period working abroad - and how, as with underwater visions and drug filtered memories, they are suspended between the punctuation marks and remain indelible for their alteredness. I think of language plus gravity, words falling, like snow coming down and covering what was there, the whiteout of forgetting. Language is a double edged sword.*

Marine and lake sediments form soils on and in which the creatures live that inhabit the bottom

of the waters, and it is easy to understand how numerous shells and other organic bodies happen thus to have been buried in muddy, sandy, or conglomeratic mechanical sediments, the component grains of which, large or small, have been borne from the land into water, thereby force of gravitation to arrange themselves as strata. By the life and death of shells in these fossilised sediments, it is also easy to understand why they are so often more or less calcareous.
*An iguana.*
The question, however, arises, how it happens that strata of pure or nearly pure carbonate of lime or limestone have been formed. Though the materials of shale (once mud), sandstone (once loose sand), and conglomerate (once loose pebbles), have been carried from the land into the sea,and there arranged as strata, and though limestones have, in great part, been also mechanically arranged yet it comparatively rarely happens that quantities of fine unmixed calcareous sediment have been carried in a tangible form by rivers to the sea, though it has some times been directly derived from the waste of sea-cliffs and mixed with other marine sediments. When, therefore it so happens that we get a mass of limestone consisting entirely of shells,corals, and other remains, which are the skeletons of creatures that lived in the sea, in estuaries, or in lakes, the conclusion is forced upon us that, be the limestone ever so thick, it has been formed entirely by the life and death of animals that lived in water.
*On seeing the sea I realise there is no beach as*



*such but a generous scattering, a slathering, of the omnipresent light grey rocks, which edge an immediately clear and surprisingly choppy sea. This sea appears to be a very deep channel, as big ships pass me by during the afternoon. It feels like there is an industrial scale port hidden to the right of the pine trees and out of my view, as if the ships are entering the city from behind.*
In many a formation - for instance in some of the masses great and small of the Carboniferous Limestone - the eye tells us that they are formed perhaps entirely of rings of encrinites or stone-lilies, or of shells and corals, of various kinds, or of all these mixed together; and in many other cases where the limestone is homogeneous, the microscope reveals that it is made of foraminifera, or of exceedingly small particles of other organic remains. Even when these fragments are indistinguishable to the naked eye, reflection tells us that such marine limestone deposits must have been built up from the debris of life, for there is no reason to believe that vast formations of limestone, extending over hundreds of square miles, are now, or ever have been precipitated in the open ocean by inorganic chemical processes acting on mere chemical solutions.
*This is a large view, different from the one I have become familiar with. I have been facing islands, low level forms, hips, bellies, rising from the sea in silhouette. Now I am looking at, in the far distance, a less friendly and enormous cliff, which houses gigantic quarrying operations, though they appear tiny. I am able to only just see dotted clusters of*

*coastal buildings, the terracotta corrugations of the roofs in the distance. It's a vast limestone facade, the edge of the continental landmass.*

It sometimes happens, indeed, that gradual accumulations of such beds of limestone have attained thousands of feet of vertical thickness in what belongs to recent times in a geological sense, as for example in the great coral reefs of the Pacific Ocean, and, in less known degree, in the calcareous and foraminiferous mud of that ocean and of the Atlantic.

*Two women are here, one is sun bathing and reading. They seem like me, we are older. A woman is in the sea when I arrive but, perhaps or perhaps not coincidentally, gets out when I put down my bags. I'm on some rocks as near as possible to the frantic waves without getting wet. I have all my snorkelling gear but no wetsuit. A mistake. I take off my clothes and leave them on the rocks. I have installed my camera in its underwater housing and I am feeling focussed as I enter the water. I feel that strange interior knowing that I am about to capture images, shoot them, like harpooning fish. Stealthy.*

But where does the carbonate of lime come from by which these animals make their skeletons? If we analyse the waters of springs and rivers, we discover that many of them consist of water that is more or less hard-that is to say, not pure, like rainwater, but containing various salts in a state of chemical solution, the most important of which is generally bicarbonate of lime; for the rain-water that falls upon the land percolates



the rocks, and, rising again in springs, carries with it salts of soda, potash, and, if the rocks be calcareous, large percentages of bicarbonate of lime in solution. The reason of this is, that all rain in descending through the air takes up a certain amount of carbonic acid - one of the constituents, accidental or otherwise, of the air; and this carbonic acid has the power of dissolving the carbonate of lime which enters into the composition of a large proportion of stratified rocks, which sometimes as pure limestone, form great tracts of country. In this way it happens that springs are often charged with lime, in the bicarbonate, which is carried by rivers into lakes and estuaries, and, finding its way to the sea, material to shell-fish and other marine animals, through their nutriment,to make their shells and bones. Thus it happens that, by little and from sea-water to form parts of animal, which, dying in deep clear water, frequently produce by their skeletons and shells immense masses of strata of nearly pure limestone, which is consolidated into rock almost as fast as it is formed.

*I plunge. The hit - instant sensation of cold-hot-cold-physical-sensory-overload and wipe-out of emotions occurs. An instant that empties one of all baggage, obliterates it, and one can just be, here, now.*

What is going on has been going on throughout all known geological time, from that of the deposition of the Laurentian rocks down to the present day. Now, if we had never found any fossil remains embedded in the rocks, we should lose half the interest of this investigation, and

our discovery, that rocks are of different ages, would have only a minor value. We find at the base, beds of limestone, perhaps composed of corals and shells. The organic remains in the upper part of these beds lie above those in the lower part, and therefore the latter were dead and buried, before the once living shells which lie in the upper part inhabited the area.

*I am swimming for only ten minutes, obsessed and enthralled by the seaweeds, the fish, rounded silvery and small, and striped black ones, like a painter's tiger in the grass, crabs lurking, that familiar red weed, the whitish blue anemones, the fine white feathers, a dusting, flocking of beige particles upon everything. All around monochrome, sunlit by wavering beams, and perhaps due to the overwhelming blue green the colours are utterly different, less varied. All light being filtered through rippling seawater. Imagine being under here at night. Chilling thought. I become cold and clamber out into the breeze.*

Above the limestone lie beds of shale, a conglomerate, and then comes the bed of sandstone, therefore the shells (if any) in the bed of shale, are of younger date than those in the bed of limestone, the organic forms, plants or animals as the case maybe, in the conglomerate, were buried among the pebbles at a later date than the shells in the shale, and the remains of life in the sandstone, were latest of all; and in each bed, each particular form found there, lived and died before the sediment began to be deposited that forms the bed above.



*When I emerge dripping onto the rocks, moving carefully to avoid urchins or dropping the camera or falling, one of the other women calls to me - "This is a military zone. You must be careful". She points at a sign affixed to a wire fence that entered the sea. Nowhere on it can I see "No swimming", just "No video, No photo, No walking" - oddly designated by graphic images with lines struck through them, like mistakes. "Oh" I say, "oh oh". "Yes" she says, then adds - "Someone was shot, you have to be careful". I feel a shock run through my nervous system, bringing me back to myself. Yes, yes, the military, and war. I see a man in blue camouflage walk slowly out onto the jetty, it's like a movie. But he is real, and he is more than a sign, and suddenly I look clearly at the fence, the way it juts into the sea and curves down into the depths. I feel sure he is looking at the camera in my hand.*

All these beds, therefore, contain relics of ancient life of different dates, each bed being younger or older than the others, according as we read the record from above or from below. But if we leave a petty quarry or sea cliff, and examine strata on a larger scale, what do we find? On many a coast, where the cliffs consist of stratified rocks, a lesson may easily be learnt on the method of understanding the order, or comparative dates of deposition of geological formations. The Liassic, Oolitic, and Cretaceous cliffs of Yorkshire, from the Tees to Flamborough Head, form excellent examples; or the coast of Devonshire and Dorsetshire, from Torquay to Portland Bill. The

horizontal line at the base represents the shore line. On the west are many strata, known as the New red or Keupermans red. These pass under thin beds of white fossiliferous limestone known as the Rhaetic beds. These in their turn dip under beds of blue limestone, Lower Lias, which are seen to dip under the Marlstone or Middle Lias, overlaid by the Upper Lias, on which rests the Inferior Oolite sand and limestone, followed by the Fuller's Earth clay. Next comes a series of strata, which for present purposes I have massed together, and which are known when they are all present as Great Oolite, Forest Marble, and Cornbrash. These under the Oxford Clay, which dips under a limestone called the Coral Rag, and still going eastward this dips beneath the Kimeridge Clay, which, in its turn, passes under the Cretaceous Series of this district, consisting of Gault, Upper Greensand and Chalk which in a bold escarpment overlooks the plain of Kimeridge Clay.

*I then realise I am shaking with cold, so get dressed quickly and leave. I look at my watch and in horror see that I am late for work. I realise I have about half an hour to traverse three or four kilometres. I am at the far side of the park-forest's summit, and it's a significant one. If I take a straight line it is extremely steep and rocky. An alternative is to curve round the hill's towering outcrops and stay safely on the tarmac road, flat. Consider this, and get it right, I think. Daunted more by the known than the unknown, I head straight up a narrow footpath into the heart of the hill's pine forest. I*



*climb and climb. The path sometimes becomes invisible but I can, as if by a strange magic or hyped-up sense, see it, feel it, know it. I imagine myself as a clever animal, one with extra sensory insights, someone who can know a path when they see one. Other people have trodden here recently.*

Here, then, we see a marked succession of strata of different lithological characters, formed, that is to say, of marls, clays, sands, and limestones, succeeding and alternating with each other. They are all sediments originally deposited in the sea, for the forms of old life found in them prove this. Some are only forty or fifty feet thick, some are more than five or six hundred feet in thickness. I stated that the continental area in which lay the lakes of the epoch of the New Red Marl, underwent partial submersion, during which our passage beds, called the Rhætic or Avicula Contorta strata, were deposited. This sinking of the land going on by degrees, resulted in the formation of groups of islands, round which, first the Lias, and afterwards the Oolitic Series were deposited, the whole, on the Continent of Europe, and now often in Britain, being grouped under the name of Jurassic formations. The general stratigraphical relations of the larger masses of the Liassic and Oolitic series, in the southern half of England, will be easily understood. The high ground now called Wales and Herefordshire, undoubtedly formed part of one of these islands; Dartmoor and other palæozoic elevations in Devon and Cornwall formed others; probably the hilly regions of Derbyshire another; and,

certainly, the Cumbrian mountains a fourth; while there can be no doubt that parts of the south of Scotland, and the greater heights of the Highlands, also stood as islands washed by the Liassic sea.

*To orientate myself I keep the sea on both sides, solid choppy blue on our left and glaring calm, sun-broken water on the right. I am still climbing, now over large rocks. I read later that karst is a terrain constituted where the underlying limestone is soluble in water. It describes a landscape of underground streams, unseen caves and spectacular formations. These protruding rocks are smoothed, luckily, and pine needles make the track soft underfoot as it is twists and submerges through forest. I am climbing fallen tree trunks. Tall pines are everywhere here. A strong sense of leaving the edge and approaching the centre. Becoming lost, losing sight of the sea. Being at the point at which it's equidistant to turn back or carry on. Deciding. There are no sideways, no alternatives, only the thin foot wide path of brown pine needles going onwards, appearing and disappearing. I am hot and I am sweating. I am walk-climb-running as fast as possible. I carry my heavy rucksack. I daren't look at my watch now. There are crickets near me, the sea has long ago fallen silent and is far below.*

It is not, however, to be supposed that the actual forms of these island territories were even approximately identical with those of the present mountains, and the limits and orographic contours of these fragments of old physical



geography can only be approximately guessed at. They have undoubtedly been subjected to repeated disturbance and upheaval since the beginning of the deposition of the Lias, but after these old palæozoic mountains first rose high into the air, they suffered so much from all the agents of waste and degradation, that in Liassic and pre-Liassic times, I have no doubt they were higher than now, and partly occupied more extended areas.

*Out of nowhere a man appears ahead, coming towards me. The usual cacophony of fear. A tightening all over. Quite young though. "Do you speak English?" I ask, "Oui", he says. This encounter affirms I am going in the right direction. "When you get to the belvedere take the road, it is quicker." I say "Merci" fervently, and keep going, passing his companion on the way, another young French man. What is a belvedere? I am anxious - is it a barn, a turret, a pole? I summon my Italian and think "bella" and "vedere" - something with a good view. There is that high spot with a structure - I have been looking at it from the sea over the past days. Now I am located. The belvedere is the extremely tall steel pylon with a cabin on its top that is at the highest point of the park-forest. I approached it from the other side a few days earlier. I feel a surge of relief as I see it getting nearer, reappearing over every clambered, sweated outcrop of stone. I can anticipate the dark shade of the tarmac road that then leads past an intriguing small house on the right, and on down towards the city. Hot piney scent is*

*emanating from the sheer drop on my right. A knife edge, a sheer slice of nothing. A cut. Air that is vertiginous, falling already. The edge enchants me.*

The lower Lias clay and Limestone is about 900 or 1,000 feet thick, where best developed in England, and consists of beds of blue clay or shale (weathering brown), interstratified with beds of blue limestone, largely quarried in Leicestershire, Warwickshire, and elsewhere, for hydraulic lime. These limestones, lying flat and unconformably on the upturned and denuded edges of the Carboniferous Limestone, form splendid cliffs on the coast of Glamorganshire, and, with the Rhetic beds, they are also well exposed in the coast section at Lyme Regis. From thence, scarcely interrupted at the east end of the Mendip Hills, the Lower Lias strikes north to the junction of the Severn and Avon, and again NE. and N. to the sea-coast of Yorkshire, E. of the river Tees.

*I keep going straight on. It is all I can do now. Then quite suddenly I can climb no more, and as at every summit ever reached I exhale broadly and am smiling. It's downhill all the way from here - I am telling myself that, as I break into an irregular run. I have a bad foot, a bad hip and a bad knee and I am not twenty five anymore. I jog and stagger in a quite speedy way that is unique, comical, ungainly. I am glad to be alone.*

Occasionally the limestones of the Lower Lias form a low escarpment, generally facing west, and, almost invariably, the Marlstone or Middle



Lias makes a similar and higher escarpment, the top of which is formed of a tough brown fossiliferous limestone, generally of only a few feet in thickness, but nearly constant in its occurrence from Dorsetshire to Yorkshire, and the very indefinite base of the Marlstone forms the eastern boundary of the Lower Lias. The Lower Lias clay and limestone of England is, as a whole, rich in fossils, the general grouping of which cannot be more than noticed here in a cursory manner.

*(There's a splinter embedded in my foot and it's moving around, causing intermittent pain, sometimes stopping me from walking. The splinter went in several years ago - slit, slip, spit, split - it's a shard of time passed, thin ghost of pain, thorn in the side. Its emergence after years, is how I feel now- unresolved, undissolved. Bits, just small pieces, return to grind away my bone endings, "It will dissolve" the youngest child says).*

These strata yield Extracrinus among the Crinoids, of Brachiopocla, a few species of Spiriferœ, Terebratulœ, and Rhynchonellœ, and numbers of Lamellibranchiate molluscs, such as Gryphœa incurva, Oysters, Pectens, Limas, Pinnas, Aviculas, Pholadomyas, and others. Having been deposited mostly in deep sea, univalve shells are much less common, but of the Cephalopoda, which are free swimmers, there are vast numbers of Ammonites, Belemnites, and Nautili, together with many fishes, and the great marine Enalosaurian reptiles, Ichthyosaurus (fish-lizard) and Plesiosaurus, and the insectivorous

flying reptile, Pterodactylus brevirostris. The Marlstone series or Middle Lias, which succeeds the Lower Lias clay, is generally somewhat argillaceous below, graduating upward into a brown, ferruginous, soft, sandy rock, with hard nodular bands, and a very marked brown ferruginous limestone at the top. It is rich in many forms of Ammonite, Belemnite, Plagiostoma, Lima, Pinna, Pholadomya, Pecten, Modiola, Terebratula, and Rhynchonella, besides a very characteristic Spirifer, one of the few remaining shells of that Palæozoic genus.

*I have seen the time. I literally have to go as fast as I can, all the way down to the city and through the centre, then uphill again - up the grey granite steps, the street paved with white marble (which is incidentally a form of heated re-crystallised limestone) and lined with plane trees, sparks of London, and finally I will be there. This walk was about being so caught up in suffering my interior feelings that I actually achieved what I could never ever do - run for two miles - first up a rocky piney hill and then down and across a hot dusty city. I felt like a winner, a marathon runner.*

Where the Lower Lias and Maristone join, the strata graduate into each other, but through the central parts of England these passage-beds are rarely clearly exposed. In Yorkshire, however, on the sea-cliffs near Staithes, the stratigraphical relations of the strata are perfectly clear, and it is evident that there is no line of demarcation between them, and through about 15 feet of strata, including some of the well-known beds



of ironstone, fossils common to both occur, one of the most conspicuous of which is Pecten œquivalvis.

*I was still in pieces, scattered, distraught, shattered, but that swim into a military zone, that underwater escape, that rocky scramble, this sweat, these events, escapades, escapes, are acting like glue and sticking me back together again - a kind of gluey freedom, born of action.*

The Upper Lias Clay plays a comparatively unimportant part in the physical geology of England. In Gloucestershire it first begins to appear near Bath, but so thin, that it is impossible to represent it on maps of the 1-inch to a mile scale. About Wotton-under-Edge it begins to get more definite, and from thence, in a narrow strip between the Marlstone rock, and the sands beneath the Inferior Oolite, it runs northward by Dursley, Stroud, Painswick, and Chipping Camden, and following all the contours of the Oolitic escarpment, looks out upon the great plain of Lias, in the broad valley of the Severn, or winds about among the intricate system of minor valleys that lie between Minchin-Hampton and Chipping Camden, and between Burford and Banbury.

*The following day another walk in Marjan, the peninsula's park-forest. Again I have worked through till mid afternoon and become exhausted. I seemed to have attracted a whole lot of negative particles, a bit like a magnet, from a woman I met after lunch. We had briefly crossed paths at work many years before. I could see part of myself lurking in her. A state*

*of mind that I try and keep the lid on - a dark wispy material at the bottom of the dressing up box - blaming, metallic, greasy. I had shuddered as I left her place, an old fashioned photography shop, and wondered "Am I also full of bitter rising shadows?"*

In this progress, gradually increasing in thickness, it forms great tracts of the clay lands in Northampton shire, between Great Brington and Arthington, and in the neighbourhood of Uppingham and Oakham in Rutland, while further north, the clay runs in a long narrow strip, still overlying the Marlstone, into Yorkshire, where it is finely exposed in the seacliffs near Whitby, and where in old times great excavations were made for the extraction of shale, and the manufacture of Alum. Taken as a whole, the Upper Lias is a stiff dark blue clay, with occasional layers of limestone often nodular, containing many Belemmites, Ammonites, and Nautili, and bivalve shells, similar, in general grouping of genera, to those of the Marlstone and Lias clay, with both of which, but especially with the Marlstone, it has species in common. In Yorkshire, the well-known jet of Whitby is excavated from the shales on the cliffs, and is formed of the fossilised stems of coniferous trees that grew on the hilly islands, on the west and north.

(*War, we are, we're... we are all part of history. Mostly we don't feel it, I don't. We are apart, separated. The screens stop things touching us, the thing becomes a picture of the thing, a representation, and we are atomised, distant.*



*We want to join something on a collective scale, we want a narrative to trump contingency. What would an alternative be? Someone suggested - a festival, a procession, a strike?).*

The remarkable assemblage of large Reptilia that inhabited the Liassic seas, the number of great and small Cephalopoda, including many species of Ammonites, Nautili, and Belemnites, the swarms of Terebratulæ and Rhynchonellæ, the plentiful genera and species of Lamellibranchiate molluscs and of univalve shells, all speak of warm seas, surrounding islands, on which grew Cycads, Zamias, and other plants, that seem to tell of a tropical or subtropical climate. Nor was this phase of the physical geography of the time specially peculiar to the Lower Lias, for it belongs alike to each of the divisions, and, as we shall by-and-by see, was continued into much later times. Nothing is more clear to me than this, that there was no break in time between the successive conventional divisions of the Lower, Middle, and Upper Lias. Each in ascending succession lies quite conformably on the other; between the Lower and Middle divisions there is a clear lithological passage, accompanied by passage of species, and though there is generally a very sudden break in lithological character between the Marlstone and the Upper Lias clay or shale (due, perhaps, to rapid depression of the area), yet contrary to a not unprevalent belief, there is a greater number of species common to these divisions than is generally imagined.

*I wander, having set off from the apartment with two heavy bags. I cannot decide where to go. I find my multiplicity - my other selves who help and hinder, never drawing breath - they are the*

*elves, dwarves, wizards, fairy godmothers. I am internally confused, prepared for all eventualities. Why do I have the wetsuit, camera, all the potential gear when I won't use it all? I walk first one way then the other. Indecisive. Self consciously turning back, and turning again. Tightening. Then, inexplicably and without thought, I start to walk up the wide steps leading from the city onto the steep hill, and I am entering the park-forest, again. I know the significance of this choice by now. I know that once I am on the top road it is impossible to descend to the coast until several kilometres have been traversed, when the road curves back down to sea level. I know this. I have felt stranded and lost more than once. Remember the nerve-fuelled run across the seemingly impassable summit? Yet I press on. It is an unseasonably hot day. Everyone says this. Everyone says how lucky we are with this late September sun.*

Few biologists and geologists now believe in the sudden extinction of entire old marine faunas, or even of the greater part of them, and their equally sudden replacement by new creations; for it begins to be generally understood that life is variable and progressive, the change of species in given areas being due chiefly, in comparatively short epochs, to migrations out of and into these areas, in consequence of changes of local conditions, such as depth of water, and nature of sediments, while in long periods of geological time, it is best accounted for by that process of evolution so clearly expounded by Darwin.

*I walk upwards, blind to ideas, blind to knowing. I am wearing heavy jeans clammy on my skin,*



*hugging too tight my muscles. My legs are mechanical, pistons carrying me up. Ascending, I sweat more. I see few people, a man cycles past me, puffing, two women run by chatting, they are young, and two tourists, a couple, are taking photos of the view (bel-vedere) which is, I admit, spectacular and breathtaking. I have become inured to it after only a fortnight. Today I take it for granted and barely appreciate it. I am the visitor putting down roots.*

Neither is it a fair test of the community of species in two so-called formations, to take the entire fauna of the lower one, and calculate the percentage of forms that pass into the overlying deposit, for, between the lower and upper parts of many thick formations, there is often the same kind of difference in assemblage of species that there is between the adjoining parts of two so-called distinct formations. In judging then of passage of species, if we had all the data, the fairest method would generally be to estimate the passage of forms by those in common between the upper part of the lower formation and the lower part of the upper one, in which case it would often be found, when there is a natural conformity between the strata, that the percentage of species that pass onward is much increased.

*Walking fast uphill, hot and carrying a lot. That is my minimal world right now, shrunk being, shrunk down to the cage of a body, my heavy stiff limbs, my thick head. Just a minimal being. It transpires I am stubbornly intent on finding a small path down the slope to avoid the long doubling back I know the road takes.*

We now come to the Oolitic series of strata. On

the flank of the Cotswold escarpment, south of Wotton-under-Edge, in Gloucestershire, the Upper Lias clay is very poorly developed, and between it and the ordinary limestone of the Inferior Oolite, there are thick beds of soft brown sand, with intermittent hard, sandy, calcareous bands, containing Ammonites, Belemnites, Pentacrinites, and bivalve shells. Above these there are bands of impure sandy limestone. According to existing lists, 17 species of Conchifera pass from the sands into the overlying Oolite strata, and, indeed, about 39 or 40 species of all kinds are common to the Upper Lias and the overlying Oolitic formations, thus linking the Lias to the Oolites in a continuous chain of specific life. The whole is apt to be fossiliferous.

*All the while it is getting sheerer. I spot an opening on the left and a path and decide to just drop down onto it, livening things up a little. It twists shockingly down into the pines, with yet more rocky outcrops, dark earth now a chalky gravel, these omnipresent pine needles. It's a hidden path, surprisingly well used. I reach a fork and have to decide. I go down, then another fork, left or right, I don't know. I imagine the path zigzags to manage the gradient, but this is more serpentine, sinuous. There are many possible paths in many different directions. People play here, games take place, rituals, or are they cycle tracks? What games are these? Who plays them?*

Plants are rare in the purely marine strata of Gloucestershire and the south of England, but



fragments of coniferous trees are sometimes found, the most remarkable of which is a large cone of Araucarites hemisphœricus. This, in addition to the nature and multiplicity of genera and species of the marine fauna, plainly tells of land not far off, a fact that will become still more clear as we get further on with the history of the Oolites, and its bearing on the old physical geography of the land of the Oolitic epoch. Throughout the southern half of England, from the English Channel to the borders of Northamptonshire, the various members of the Oolitic series maintain a tolerably uniform character. The Inferior oolitic Limestone forms the lowest member of this series. It first appears between the west end of the Chesil Bank and Bridport Harbour in Dorsetshire, from whence, underlaid by the before-mentioned sands, broken and interrupted by many faults, it ranges northward by Beaminster and Sherborne to the east end of the Mendip Hills and the neighbourhood of Bath, where it forms the flat tops of the scarped hills intersected by so many winding valleys.

*I make a choice and follow it. I am lacking momentum and I see an edge, that knife. Feel instantly panicked and lost. A voice hoodwinked me. I am hearing a man shouting, he is calling a friend or a dog. Calling the same word over and over again. It is too unusual and it clangs too loud on my outstretched nerves. Something is wrong. I become hyper aware that I am there. I am wearing a highly visible white shirt. No-one knows where I am. Instantly and deeply*

*afraid. And, quickly now, I commit myself as to where to go and what to do, for the first time this afternoon. Turn back. Retrace the path. Lost though, just go up, blind panicky, climbing, up. We don't feel anything, we are numbed by adrenaline. Part of me observes, yes, I like to do this, I clearly must like to take these risks, these thrilling geographic, geo-sociological risks.*

From thence, in a long narrow strip, it runs on by Wotton-under-Edge, Dursley, and Painswick, in Gloucestershire, near which, on the flat-topped Cotswold Hills east of Cheltenham, it broadens, and more or less forms great part of the wide plateau that extends from Burford to the neighbourhood of Chipping Camden. Beyond this region it narrows, and finally thins away, and limestone disappears in Oxfordshire, a few miles northeast of Chipping Norton, where I shall leave it for a time.

*But it's sometimes too much, another voice says - It's as if you don't have the proper sensory capacities for edges. You are always bargaining with what is real and what is fiction - there's been the fantasy versus reality, internal versus external battle raging in my head all the life long. Snap back to now, this is a step too far, it's not worth it, I have to rock climb, to actually get away. I am gripping the protruding stone, stretching my being, my body into contortions of upwardness. I am seeing my daughters hands gripping that far away coloured climbing wall. And so, now, I take encouragement from you, distant children. My hands are expert - feeling, finding, testing, gripping. My feet searching for*



*solid rock, then grasping a surface that shifts, and then another under my foot, it's moving ominously. I am taking it slower, with care, it's okay.*

It chiefly consists of yellow limestone, and along with other limestones of the series is called Oolitic, for in many cases they consist of concretionary bodies about the size of a pin's head, compacted like the eggs that form the roe of a fish (egg-stone) cemented in a calcareous matrix. One of the most typical sections occurs near Cheltenham, on the summit of the bold escarpment that overlooks that town. There, at the base, the Oolitic grains are often as large as peas, and the rock is locally called pea-grit. The Fuller's Earth accompanies and overlies the Inferior Oolite through the whole length of this area, excepting where locally interrupted by faults. It consists chiefly of tenacious bluish clay, with frequent thin shelly bands of limestone, often largely charged with a small oyster, Ostrea acuminata, and with Terebratulæ.

*Suddenly, thankfully, easily, I am on the top road once more. Safe. I breathe, and walk again. Long, along and along in the heat of the afternoon. Pines above, pieces of gravel underfoot, crickets, sun glare, shades, phone, google maps, satellite connections, reading glasses, rucksack, and below the light splintered sea. Long in the heat of the afternoon.*

In the neighbourhood and south of Bath a strong band of limestone lies in the middle of the clay, known as the Fuller's Earth Rock. Near Upper Slaughter in Oxfordshire, this subformation

entirely thins away, and is known no more. Its greatest thickness, near Bath, is about 200 feet. The name was originally given to it because in places it contains beds of Fuller's Earth, long ago much used in the famous woollen factories of Gloucestershire. I call it a subformation, because very many of its fossils are also common in the Inferior Oolite, though a few are peculiar. The Great or Bath Oolite of this southern half of England succeeds the Fuller's Earth, and consists, when fully developed, of Forest Marble, Great Oolite, Stonesfield Slate. The local development called the Stonesfield Slate consists of beds of laminated shelly and oolitic limestone and sandy flags, with much false bedding, and containing ferns, Cyclopteris, Glossopteris, Pecopteris, Cycads, Bucklandia squamosa, Zamias, Palœozamia of various species, and Coniferæ. Elytraof beetles and wings of insects; bones of Plesiosaurus, Crocodile, also Ostrea, Terebratula, Rhynchonella, Lima, Pecten, Trigonia, Patella, Nerinœa, Belemnites, Ammonites, are all found in these thin shallow water deposits.

*After a little while another opening appears on the left of the road. This path has actual steps and I again decide to try and cut short the walk. Again I venture off piste down the steep slope to the sea. Around a corner I meet one of the most beautiful men I have ever seen. He has black hair, very curly, and looks like someone from the historical images I saw on the internet the night before. He is obviously distantly related to a Roman god. He is with a young boy, probably*



*his son. They have a large calm dog with them, an Alsatian. I ask him the way. He reassures me it is easy to get to the beach, "Keep going down, and even though it is written 'Private' don't worry, just go through."*

The reptiles include Ichthyosaurus advena, Plesiosauruserraticus, and crocodiles of the genus Teleosaurus, allied to the Gavial of the Ganges, together with a great carnivorous lizard, Megalosaurus Bucklandi, that walked on the neighbouring land, and was probably about 30 feet in length. A flying reptile, Ramphorhynchus Bucklandi, allied to the Pterodactyle, is found in this subformation, which has long been especially celebrated as containing the remains of mammals, viz. the lower jawbones of species of small insectivorous marsupials.

*I am skipping along now, not literally, but relieved, glad to be going in the right direction. Descending. I pass two teenage boys smoking weed and then pass a woman who looks like someone at my daughters school, incongruously well dressed in the mornings. This person is so upbeat that I feel astonished and delighted by her. Wearing fishnet tights and a green dress of wool on this hottest of afternoons, she is obviously very happy.*

I call the Stonesfield Slate a local development because it is by no means of universal occurrence at the base of the Great Oolite, and is chiefly known in those parts of Gloucestershire that lie eastward of Cheltenham on the broad Oolitic plateau, and in Oxfordshire at and near the town of Stonesfield, where it perhaps attains its greatest

thickness. There it is largely manufactured into what are called slates, but in reality are small slabs, the coarse fissile character of which has no relation to what is known as slaty cleavage. From these areas going south along the Oolites, the Stonesfield Slate rapidly thins away, or changes its lithological character, for it is quite unknown at the base of the Great Oolite towards Wotton-under-Edge and Bath. In the opposite direction going northward, the Stonesfield Slate passes into the Northampton Sand, where we will leave it for the present. It first makes its appearance on the south near Norton St. Philip, about six miles south of Bath, from whence, overlaid by Forest Marble, it ranges northerly, forming the flat-topped scarped hills on either side of the Avon near Bath, and so on by Wotton-under-Edge to Minchin-Hampton.

*Then I am on the beach. Other people are there and they may or may not notice me arrive. And now, of all the surprises of this long afternoon, a weird disappointment floods me. There is a cafe here. I sit on a generic white beach chair with a bottle of mineral water. I cannot move. Having felt so close to doom, I am stricken, inert, stopped.*

Beyond this it forms a large part of the table land, intersected by valleys, that lie between Minchin-Hampton in Gloucestershire and Towcester in Northamptonshire. In Northamptonshire its lowest sandy beds are the equivalents of the Stonesfield Slate. To this part of the subject I shall return in describing important physical changes that take place further north. The best



beds of the Great Oolite are of cream-coloured limestone, so soft when first extracted from the quarry, that it can be easily sawed into blocks, but hardening on exposure. Some of its fossils are also found in the Fuller's Earth and the Inferior Oolite, and a few are first known in the Lias, and, indeed, throughout the whole there is a general agreement in the genera of shells. Corals occur in the Great Oolite. Ammonites and Belemnites are rare at Minchin-Hampton, but further south Gasteropoda decline, and Cephalopoda are more numerous. Fishes' teeth, Hybodus, Pycnodus, and Strophodus, and scales of Lepidosteus are sometimes found, and reptiles of the genera Teleosaurus and Megalosaurus, together with the gigantic Ceteosaurus (or whale-lizard), probably about 50 feet in length, and most likely amphibious. The Forest Marble forms the topmost beds of the strata that usually are called Great Oolite. They are formed of shelly limestone, with much false bedding, very similar in structure to the Stonesfield Slate, and as a marble the rock has sometimes been used for ornamental purposes. Its beds are full of Oysters, stems of Pentacrinites, fragments of Echinodermata, Pectens, Aviculœ, Terebratulœ.

*When I eventually get up from the terrace of plastic tables it is much later, almost evening. The sun is cool, a wind has picked up. I walk round the small bay and all the way along to the jetty to where some sun still shines. I am stubborn. I am late. I throw my bags onto the upholstered benches and lie down, landing in a heap of longed for ease. It will soon be October,*

*the water incrementally losing warmth, the sun going down earlier, every day. Self consciousness returns, the earlier rushing fear had stripped it off and left it lying on the rocky path. Now it's been put on again and I have to cajole myself to get up and walk past the dwindling sunbathers. I climb down the ladder, in, and swim through dark cooling water into deep green sea.*

In it occurs the Bradford clay, in which is found the beautiful Crinoid, Apiocrinites Rotundus, and also Terebratula Digona, and many fragments of Coniferous wood. It is partly formed of pale limestones and clays, passing in places into shelly, and occasionally oolitic, building-stones. When partly decomposed near the surface, it assumes a rubbly character, and forms a fertile soil, whence its agricultural name of Cornbrash, the word brash being an old word expressive of this loose rubbly character. The Cornbrash is generally very fossiliferous, the general assemblage of genera of Echinoderms, corals, Cephalopoda, Brachiopoda, Lamelli branchiata, being much the same as in the Great and Inferior Oolites. So much, indeed, is this the case, that of the forms found in the Great Oolite, 100 species pass into the Cornbrash, while of those in the Inferior Oolite, 89 species pass up into the same formation. On the south coast the Forest Marble borders the sea for a considerable distance between Bridport Harbour and Portland Isle, from whence it ranges north by Wincanton to Frome in Somersetshire. A few miles further north, the Great Oolite proper crops from



underneath it near Norton St. Philip, and beyond this town and Bath it everywhere overlies the Great Oolite, and forms the surface of vast tracts of country between the Avon, Cirencester, and Burford, in Gloucestershire, beyond which, towards Witney, on the river Windrush, it gets broken into outliers, and also becoming thinner, it either dies out, or is gently overlapped by the Cornbrash about three miles north of Bicester in Oxfordshire. The Cornbrash forms the uppermost member of those formations that are usually classed as Lower Oolite.

*Light levels are too low for filming, underwater is just turquoise-black-bottle-green. It is liquid night. Partially terrifying. The pressing down of air onto water, a subtle defining layer that is now hard to make out from below. I need that division of matter, the place where I know I can surface and breathe. It's this layer, this fine line, this film, this is what I keep wanting to capture with the camera. Looking for it now, I cannot see it, I cannot breathe. It's a type of claustrophobia from losing the vital senses - sight and hearing - an extreme disorientation.*

Facts of this broad kind are of more importance to the general reader than trying to remember names of fossils, and what I now endeavour to do, is to disabuse the mind of the idea, too often implied in manuals, that the marked characteristic of strata is, that they consist of perfectly distinct zones, each having its own species, which have little connection with each other. What applies to the Lias and Lower Oolites, equally applies to the connection of the

latter with the Middle, and of the Middle with the Upper Oolites, and I shall therefore treat the remainder of this subject as briefly as possible. It is generally of inconsiderable thickness (15 to 100 feet), and beginning in Dorsetshire between Bridport and Weymouth, it ranges at the surface all across that county, excepting where overlapped by the Cretaceous strata between Abbotsbury and the neighbourhood of Evershot. It is remarkably constant, striking with the underlying and overlying strata all through Wiltshire, Gloucestershire, Oxfordshire, and Northamptonshire, and onward into Lincolnshire; but north of the Humber it disappears for a space, being again overlapped by unconformable Cretaceous strata. Throughout all this long range it retains in a remarkable manner the same lithological character, showing evidence of deposition in shallow water.

*The surface, this pressed upon surface, where one can see gravity tangibly pulling, pushing the air - the substance we live in, onto the medium we don't - water. This is where I dwell. Looking up at the next life.*

This community of forms is very important, showing as it does, that if some of the Inferior Oolite species are absent in the Fuller's Earth and Great Oolite, they must, nevertheless, during the deposition of these strata, have lived elsewhere, and returned in a later time, that of the Cornbrash, to inhabit the same area when a congenial set of marine conditions ensued, thus establishing a strong and direct succession of life through the whole of these formations which



together, in the language of the day, form the Lower Oolite. In fact, this division of these strata into formations, is in great part lithological, and the difference of faunas in them was dependent on changes of conditions of depth in a sea, where limestone, sands, or clays were being deposited.

*I do some filming, even though the built in meter insists it is too dark. Limpid silken surface - low sun flares into cinematic moment - too pink, too gold, capturing glory, amber-set, another watercolour, varnished, another blood-logged sunset.*

The four so-called Oolitic formations already described, may in truth be spoken of as one, there being not much more difference between their fossils than there is between those of what are called different zones in other recognised single formations. The next group of strata, as generally received, is formed of the Middle Oolites, which consist of the following divisions, the oldest being placed at the bottom. In the south of England, much faulted, the Oxford Clay occupies considerable strips of country between Weymouth Bay and the river Bredy, about a mile east of Burton Bradstock. Beyond that faulted region, and the overlapping of the Cretaceous strata of Dorsetshire, the Oxford Clay, about 650 feet in thickness, comes on in great force at Melbury Samplord and Melbury Osmund, where it is underlaid by about 50 feet of Cornbrash. From thence it runs somewhat north-easterly, covering a broad tract of country, by Melksham in Wiltshire, and so on by Chippenham, Cricklade, Fairford, Bampton, Oxford, Bicester,

Buckingham, Fenny Stratford and Bedford, north of which it covers an immense tract of country, twenty miles in width, in the neighbourhood of Huntingdon.

*At the apartment later I watch the footage. What seems to work is where I'm holding the camera still, tight against the swimmers ladder off the jetty. The waves are agitated, repetitive, and arrive on the lens aggressively tapping, driven by the breeze. Like this they are starting to erode the glass eye of the lens, the surface of the image.*

Still further north it underlies the great alluvial flats of Cambridgeshire, and the waters of the Wash, and beyond this, in Lincolnshire, in consequence of the gradual overlap of the Cretaceous strata, the area occupied by the Oxford Clay narrows by degrees. North of the Humber it is entirely overlapped for a space, to reappear in Yorkshire, where it is well exposed on the sea-cliffs in Filey Bay, accompanied by the Kelloway Rock. Not the least remarkable circumstance connected with the Oxford Clay is the very frequent occurrence in it of this Kelloway Rock, which some persons would willingly raise to the rank of an independent formation, because of its palæontological peculiarities. The thin clay that occasionally lies beneath it contains a goodly proportion of species also found in the Cornbrash, but a greater number found in higher parts of the Oxford Clay. An equal number passes upward from the Kelloway Rock into the overlying Oxford Clay, or, if absent there, are found in formations still higher in the series. The



Kelloway Rock contains many Gryphœas and Ammonites, one of which, A. Calloviensis, is especially characteristic of this stratum. Several other Ammonites, and Ancyloceras Calloviense, besides Nautili, are found in it. Brachiopoda and Lamellibranchiata, of genera and some species common to all the Oolites, are common.

*The camera, on auto, deals mechanically with light and dark, distance and closeness, and the waves, also automatic, retreat and overwhelm. The device optically and digitally breathes.*

*The camera is my prosthetic eye. It has become part of my body but also our collective body - everyone seems to be filming now. The waves overlap and submerge and recede. Glistening surface gives way to the dark green under.*

Escaping from this overlap, the clay runs eastward by Abingdon, Netley, Quainton, and the south end of Stewkley, between which and Leighton Buzzard it is again overlapped by broad-spreading strata of Gault and Lower Greensand. Between this area and the fens of Lincolnshire it doubtless lies deep underground, well to the east of the Chalk escarpment, for it is well known to underlie much of the marshes on either side of the Wash, from whence it trends north in a strip at the base of the Lincolnshire Wolds as far as the Humber, where it is again unconformably overlapped by the Cretaceous strata of the Yorkshire Wolds, to reappear in great force in and around the Vale of Pickering, between Hambleton Hills and Filey Bay in Yorkshire. The Coral Rag is a rubbly limestone, trending, with occasional interruptions, from

Somersetshire to Yorkshire, the details of which it is unnecessary to give. It is associated in places with sandy strata known as the Calcareous grits, and is often almost entirely composed of broken shells and Echini, Cidaris Smithii, Hemicidaris intermedia, Pygaster umbrella, Pygurus costatus, and numerous corals (whence its name) of the genera Isastrea, Thecosmilia, Protoseris, Ammonites, a few Gasteropoda, and various genera of bivalves, common in the Oolitic formations. This formation is rarely more than about 300 feet thick, and about one-third of its fossils are well known in older Oolitic strata, while less than a tenth pass upward into the overlying Kimeridge Clay and Portland rocks.

*I feel more scientific - I am a geological core sampler, a scanner of the interior, a dip stick in oil. The video somehow works. This attempt to go beyond the end of looking, seeing, to get further into the world, in it, senses-wise, to get haptic. The eye, the look, has dominated, decimated our consciousness. I'm trying to get away from views and images, there's too much to look at, too much. It's incomprehensible, off the scale, and it outweighs everything else. It makes everyone's heads hurt. We are all lying down now, on these benches, the upholstered ones by the sea where the sun's rays fall, and we all close our eyes in massive relief.*

For reasons connected with the physical geography of this epoch, which will be mentioned further on, a little east of Longcott, a great tongue of Lower Greensand, running out to Farringdon, overlaps the Kimeridge Clay. The



Kimeridge Clay is in places from 500 to 600 feet in thickness, but of late, in a great experimental boring in the Weald of Kent, after passing through the Purbeck and Portland Limestones and Sand, it was pierced to the depth of 921 feet, below which came clays supposed to be the Coral Rag and Oxford Clay, the base of which was not reached at 1,906 feet when for financial reasons the boring was abandoned. The meaning of this seems to be, that whereas these clays, in their range from Dorsetshire to Yorkshire, were deposited in comparatively shallow areas not very far from land, in the Kent area they were laid down in a much deeper sea. A shell peculiarly characteristic of the Kimeridge Clay is a large oyster, and Terebratula, Discina, Lingula ovalis, Pinna, Astarte, Pecten, Trigonia, and other bivalves, and Ammonites and Belemnites, are also common, the Belemnites sometimes almost paving the ledges of the seashore in Kimeridge Bay. Fishes of the Oolitic genera already named, with others, are found, and many remains of reptiles, among others Turtles, Crocodiles of the genera Goniopholis, Teleosaurus and Steneosaurus, 5 species of Ichthyosaurus, 8 of Plesiosaurus, and 5 of Pleiosaurus, some of the last of great size. Cetiosaurus longus and Megalosaurus Bucklandi also occur. Fragments of wood are not uncommon.

*Walking amongst these pines was about the language of their needles, about adrenaline and heat, a meeting of inside and out, interior and exterior worlds. About the physical presence and urgency of the body, the self, exuding*

*through its pores. Pores not eyes, pine needle pin pricks, lungs as well as thin reticent images.*
The Portland Limestone and Sand lie above the Kimeridge Clay. The best sections of these rocks occur in the Isle of Portland. The sand which forms the base of the formation, is there 150 feet thick, and the limestone about 70. Of this, about 20 feet forms marketable stone in three horizons, from the best part of which the celebrated Portland stone is derived, used in many public buildings, of which St. Pauls may be cited as an example. The limestone, like those of most other Oolite formations, is cream-coloured, and generally fossiliferous. The Portland stone also occurs at the south end of Tisbury in Wiltshire, at Swindon, and in the Vale of the Isle of Purbeck, in the Vale of Aylesbury. The beds are very inconstant in their out crop, only showing at those places which were probably near the original western margin of the sea of the period. At Swindon both limestone and sand are of trifling thickness. Outliers of it occur in Bedfordshire, and the whole has evidently been exposed to denudation before the deposition of the Cretaceous rocks.
*I had decided to make towards a point in the far distance and then physically reach it. Imagine the belvedere, way up there on the top of the peninsula's ridge, way above all the rock climbers, towering small above everything, looming over the tops of the pines, there it is - as I walk towards it, it became large, a massive thing, tall, too tall to climb, too tall to look at, craning my head, it's becoming a serious body*



*in space, a location, and no longer a sight. I am a tightrope walker between two geologies, plateaux. The journey between is tremulous. And tremendous.*
Such is a brief outline of the marine Oolitic strata.

# Lim est one Inter rupt ions

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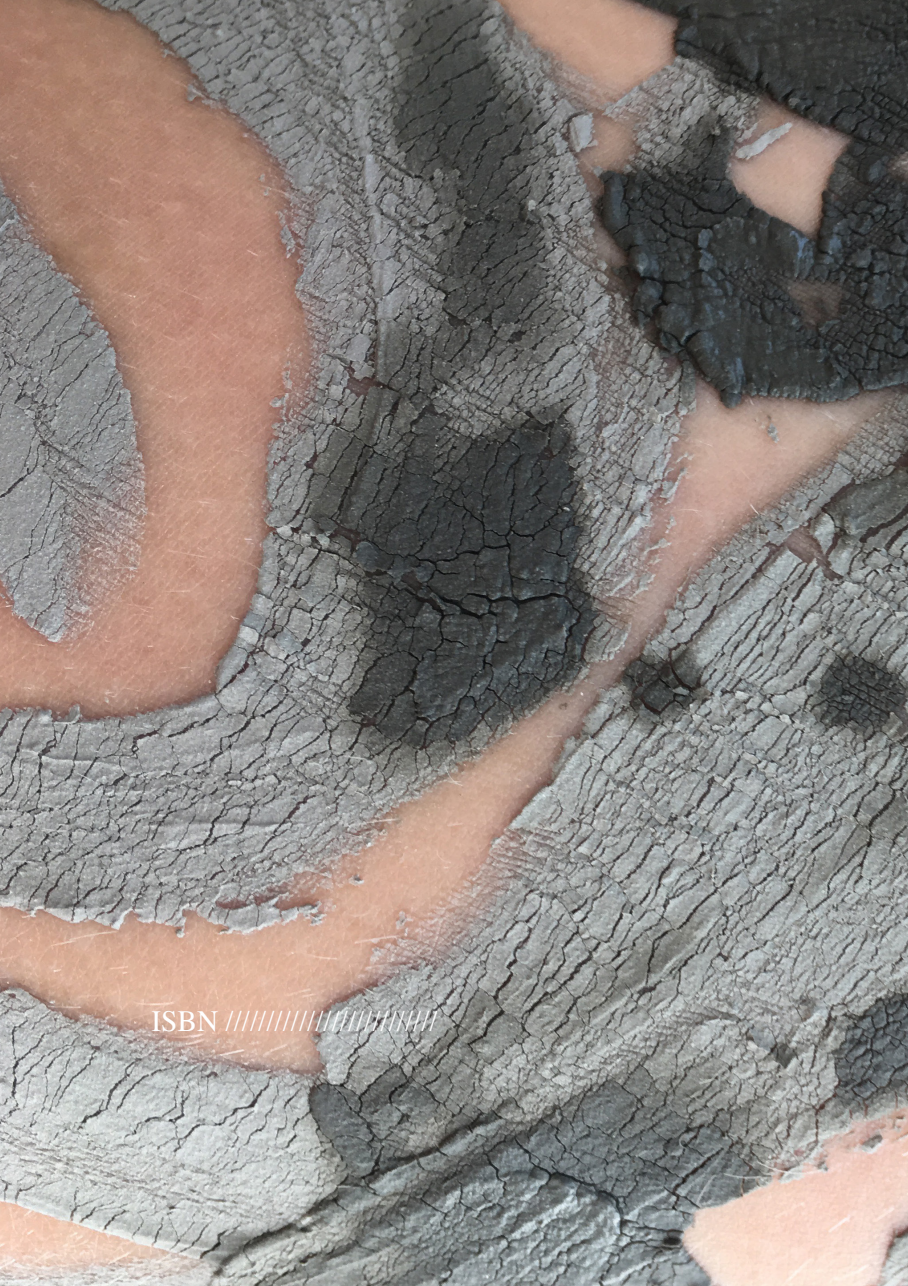

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