

I. Mr. John Clayton, Rector of Crofton at Wakefield, his Letter to the Royal Society, giving a farther Account of the Soil, and other Observables of Virginia.

I Shall here present you with a Continuation of my Remarks on the River, Soil, and Plants of *Virginia*. And first, as to the River on the other side the Mountains, said to Ebb and Flow. I have been assured by Col. *Bird*, who is one of the Intelligest Gentlemen in all *Virginia*, and knows more of *Indian* Affairs than any Man in the Country, that it was a Mistake; for that it must run into a Lake, now called *Lake Petite*, which is fresh Water; for since that time a Colony of the *French* are come down from *Canada*, and have seated themselves on the back of *Virginia*, where *Fallam* and the rest supposed there might be a Bay, but is a Lake, to which they have given the Name of *Lake Petite*, there being several larger Lakes 'twixt that and *Canada*. The *French* possessing themselves of these Lakes, no doubt will in short time be absolute Masters of the Beaver Trade, the greatest number of Beavers being catch'd there. The Colonel told me likewise, that the common Notion of the Lake of *Canada*, he was assured was a Mistake, for the River supposed to come out of it, had no Communication with any of the Lakes, nor the Lakes one with another, but were distinct. But not to ramble after hear-say, and other matters; but to return to the Parts of *Virginia* inhabited by the *English*, which in general is a very Fertile Soil, far surpassing *England*, for there *English* Wheat (as they call it, to distinguish it from *Maze*, commonly called *Virginia* Wheat) yields generally 'twixt Fifteen and Thirty

Thirty fold, the Ground only once plow'd ; whereas 'tis a good Crop in *England* that yields above Eight fold, after all their toil and labour. And yet in truth 'tis only the barrenest Parts that they have cultivated, Tilling and Planting only the High-Lands, leaving the Richer Vales unfir'd, because they understand not any thing of Draining. So that the Richest Meadow-Lands, which is one third of the Country, is Boggy, Marsh, and Swamp, whereof they make little Advantage, but loose in them abundance of their Cattle, especially at the first of the Spring, when the Cattle are weak, and venture too far after young Grass. Whereas vast Improvements might be made thereof ; for the generality of *Virginia* is a Sandy Land with a shallow Soil. So that after they have cleared a fresh piece of Ground out of the Woods, it will not bear Tobacco past two or three Years, unless Cow-pen'd ; for they Manure their Ground by keeping their Cattle, as in the South you do your Sheep, every Night confining them within Hurdles, which they remove when they have sufficiently dung'd one spot of Ground ; but alas ! they cannot Improve much thus, besides it produces a strong sort of Tobacco, in which the Smokers say they can plainly taste the fulsome-ness of the Dung. Therefore every three or four Years they must be for clearing a new piece of Ground out of Woods, which requires much Labour and Toil, it being so thick grown all over with Massy Timber. Thus their Plantations run over vast Tracts of Ground, each ambitioning to engross as much as they can, that they may be sure to have enough to Plant, and for their Stocks and Herds of Cattle to range and feed in, that Plantations of 1000, 2000, or 3000 Acres are common, whereby the Country is thinly inhabited : their Living solitary and unfociable ; Trading confused and dispersed ; besides other Inconveniencies : Whereas they might Improve 200 or 300 Acres to more Advantage, and would make
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the Country much more Healthy ; for those that have 3000 Acres, have scarce cleared 600 Acres thereof, which is peculiarly termed the Plantation, being surrounded with the 2400 Acres of Woods ; so that there can be no free or even motion of the Air, but the Air is kept either stagnant, or the lofty Sulphurous Particles of the Air, that are higher than the tops of the Trees, which are above as high again as the generality of the Woods in *England*, descending when they pass over the cleared spots of Ground, must needs in the violent heat of Summer, raise a preternatural Ferment, and produce bad Effects. Nor is it any Advantage to their Stocks, or Crops ; for did they but drain their Swamps, and Low-Lands, they have a very deep Soil, that would endure Planting 20 or 30 Years, and some would scarce ever be worn out, but be ever longer better, for they might lay them all Winter, or when they pleased in Water, and the Product of their Labour would be double or treble, whether Corn or Tobacco ; and that this is no fond Projection, (though when I have discoursed the same to several, and in part shewn them how their particular Grounds might be drained at a very easie rate) they have either been so conceited of their old way, so sottish as not to apprehend, or so negligent as not to apply themselves thereto. But on the Plantation where I lived, I drained a good large Swamp, which fully answered expectation. The Gentlewoman where I lived, was a very Acute Ingenious Lady ; who one day Discoursing the Overseer of her Servants, about pitching the ensuing Year's Crop. The Overseer was naming one place where he designed to Plant 30000 Plants, another place for 15000, another for 10000, and so forth the whole Crop, designed to be about 100000 Plants: Having observed the Year before he had done the like, and scattered his Crop up and down the Plantation, at places a Mile, or a Mile and a half asunder, which was
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very inconvenient, and whereby they lost much time. I interposed, and asked, why they did not Plant all their Crop together? The Fellow smiled as it were at my Ignorance, and said, there was very good Reason for it. I replied, that was it I enquired after. He returned, the Plantation had been an old planted Plantation, and being but a small Plot of Ground, was almost worn out, so that they had not Ground altogether that would bring forth Tobacco. I told him then they had better Ground than ever yet they had planted, and more than their Hands could manage. He smiled again, and asked me, where? I then named such a Swamp. He then said scornfully, he thought what a Planter I was; that I understood better how to make a Sermon, than managing Tobacco. I replied with some warmth, tho' I hoped so, that was Impertinence, and no Answer. He then said, that the Tobacco there would drown, and the Roots rot. I replied, that the whole Country would drown if the Rivers were stopt, but it might be laid as dry as any Land on the Plantation. In short, we discoursed it very warmly, till he told me, he understood his own Business well enough, and did not desire to learn of me. But the Gentlewoman attended somewhat better to my Reasoning, and got me one day to go, and shew her how I projected the draining of the Swamp, and thought it so feasible, that she was resolved to have it done; and therefore desired me I would again Discourse her Overseer, which I did several times, but he would by no means hearken thereto, and was so positive, that she was forced to turn him away, to have her Servants set about the Work; and with three Men in thirteen days I drained the whole Swamp, it being Sandy Land, soaks and drains admirably well, and what I little expected, laid a Well dry at a considerable distance. The Gentlewoman was in *England* last Year, and I think *Dr. Moulin* was by when she asked me. Now to teach her how she might

make her Tobacco that grew in that Swamp less, for it produced so very large, that it was suspected to be of the *Aranoko* kind: I told her, though the Complaint was rare, yet there was an Excellent Remedy for that, in letting every Plant bear Eight or Nine Leaves instead of Four or Five, and she would have more Tobacco, and less Leaves. Now you must know, they top their Tobacco, that is, take away the little top-bud, when the Plant has put forth as many Leaves as they think the Richness of the Ground will bring to a Substance; but generally when it has shot forth four or six Leaves. And when the top-bud is gone, it puts forth no more Leaves, but Side-branches, which they call Suckers, which they are careful ever to take away, that they may not impoverish the Leaves. I have been more tedious in the Particulars, the fullier to evince how resolute they are, and conceitedly bent to follow their old Practice and Custom, rather than to receive Directions from others, tho' plain, easie, and advantageous. There are many other places are as easie to drain as this, tho' of larger extent, and richer Soil, for some of which I have given Directions, and have only had the return perhaps of a flout afterwards: Even in *James Town Island*, which is much what of an Oval Figure, there's a Swamp runs Diagonal wise over the Island, whereby is lost at least 150 Acres of Land, which would be Meadow, which would turn to as good Account as if it were in *England*: Besides it is the great annoyance of the Town, and no doubt but makes it much more unhealthy. If therefore they but scour'd the Channel, and made a pretty ordinary Trench all along the middle of the Swamp, placed a Sluce at the Mouth, where it opens into the back Creek; for the Mouth of the Channel there is narrow, has a good hard bottom, and is not past two Yards deep when the Flood is out; as if Nature had designed it before hand: They might thus drain all the Swamp absolutely

folutely dry, or lay it under Water at their pleasure. I have talked feveral times hereof to Mr. *Sherwood*, the Owner of the Swamp, yet nothing is effayed in Order thereto. And now ſince we are ſpeaking of *James Town*, give me leave to adjoyn ſome Reflections as to the Situation and Fortifications of the place. The Natural Situation of the place is ſuch, as perhaps the World has not a more Commodious place for a Town, where all things conſpire for Advantage thereof.

James Town Iſland is rather a *Peninſula*, being joyned to the Continent by a ſmall Neck of Land, not paſt Twenty or Thirty Yards over, and which at Spring-Tides is overflow'd, and is then an abſolute Iſland. Now they have built a ſilly ſort of a Fort, that is, a Brick Wall in the ſhape of a Half-Moon, at the beginning of the Swamp, becauſe the Channel of the River lies very nigh the Shoar; but it is the ſame as if a Fort were built at *Chelſey* to ſecure *London* from being taken by Shipping. Beſides Ships paſſing up the River are ſecured from the Guns of the Fort, till they come directly over-againſt the Fort, by reaſon the Fort ſtands in a Vale, and all the Guns directed down the River, that ſhould play on the Ships, as they are coming up the River, will lodge their Shot within Ten, Twenty, or Forty Yards in the riſing Bank, which is much above the Level of the Fort; ſo that if a Ship gave but a good Broad-ſide, juſt when ſhe comes to bear upon the Fort, ſhe might put the Fort into that confuſion, as to have free Paſſage enough. There was indeed an Old Fort of Earth in the Town, being a ſort of *Tetragone*, with ſomething like Baſtions at the four Corners, as I remember; but the Channel lying further off to the middle of the River there, they let it be demolifhed, and built that new one ſpoke of, of Brick, which ſeems little better than a blind Wall, to ſhoot Wild Ducks or Geefe.

If they would build a Fort for the Security of the Town and Country, I conceive it should be on *Archer's Hope Point*, for that would stop the Ships from passing up the River, before they came to the Town, and would secure the Town from being block'd up by Sea. The Channel at *Archer's Hope Point* lies close by the Shoar, and makes such an Angle there by reason of *Hog Island*, that going up or down the River, let the Wind be where it will, they must there bring the contrary Tack on Board, and generally when they About the Ship as they call it, they are so nigh the Shoar, that a Man may almost sling a Finger-stone on Board. How much this hinders the motion of a Ship, and what Confusion it must be to them to bring a contrary Tack on Board, whilst they have all the Guns of a Fort playing so nigh upon them, may readily be conceived. *Archer's Hope* is a Neck of Land, that runs down three Miles long, not much past half a Mile broad betwixt the Main River and *Archer's Hope Creek*, which has large Marshes and Swamps; so that a Citadel built upon the Point, would almost be Impregnable, being it could be attack'd no way but one, which is so narrow a slender Neck of Land, that it would be difficult to take it that way: And it would secure *James Town* from being block'd, being it would not be past a Mile by Water, to the Point of *James Town Island*. The Island is so surrounded with Water and Marshy Land, than the Town could never be Bomb'd by Land. But now to return to the Reflections of Improving, and Manuring of Land in *Virginia*; hitherto, as I have said, they have used none but that of Cowpenning; yet I suppose they might find very good Marle in many places, I have seen both the red and blew Marle at some breaks of Hills: This would be the properest Manure for their Sandy Land, if they spread it not too thick, theirs being, as I have said, a shallow, Sandy Soil, which was the Reason I never advised any to use Lime, tho'

tho' they have very good Lime of Oyſter-ſhells; but that's the propereſt Manure for cold Clay Land, and not for a Sandy Soil. But as moſt Lands have one Swamp or another bordering on them, they may certainly get admirable Slitch, wherewith to Manure all their uplands. But this, ſay they, will not improve Ground, but clods and grows hard; 'tis true, it will do ſo for ſome time, a Year or two at the firſt; but did they caſt it in heaps, and let it lye for two or three Years after a Froſt or two had ſeized it, and it had been well pierced therewith, I doubt not it would turn to good Account: And for this too I have ſomething more than bare conjecture; for Diſcourſing it once with a good notable Planter, we went to view a heap thereof, that caſually he had caſt up 'twixt three and four Years before, and we found it not very binding, but rather a fine Natural Mold, whereupon he did confeſs, he then remembred that out of a ridge of the like Mold he had had very large Plants, which muſt have been of the like Slime or Slitch caſt up before: But ſaid, that himſelf and others deſpaired of this Manure, becauſe they had taken of this Slitch freſh and moiſt out of the Swamp, and filled Tobacco Hills with it, and in the miſt of it planted their Plants, which ſo bound the Roots of their Plants, that they never came to any thing. But he ſaid, he then ſaw his Error, yet I have not heard he has remembred to Correct it. But 'tis ſtrange in how many things beſides they are remiſs, which one would think *Engliſh* Men ſhould not be guilty of. They neither Houſe nor Milk any of their Cows in Winter, having a Notion that it would kill them; yet I perſwaded the afore-mentioned Lady where I lived, to Milk four Cows the laſt Winter that I ſtaid in the Country, whereof ſhe found ſo good Effect, that ſhe aſſured me ſhe would keep to my Advice for the future; and alſo as I had further urged, Houſe them too, for which they have mighty Conveniencies, their Tobacco Houſes
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being empty ever at that time of the Year, and may easily be fitted in two or three days time without any Prejudice; whereby their Cattle would be much sheltered from those pinching sharp Frosts that some Nights on a sudden become very severe. I had another Project for the Preservation of their Cattle proved very successful; I urged the Lady to sow her Wheat as early as possibly she could, so that before Winter it might be well rooted, to be early and flourishing at the first of the Spring: So that she might turn thereon her weak Cattle, and such as should at any time be swamp'd, whereby they might be recruited and saved, and it would do the Wheat good also. I advised her likewise to save, and carefully gather her *Indian* Corn-tops, and blades, and all her straw, and whatever could be made Fodder, for her Cattle; for they get no Hay, tho' I was urging her to that too, and to sow *Saintfoin*; for being a Sandy Soil, I am confident it would turn to very good Account. They have little or no Grass in Winter, so that their Cattle are pined and starved, and many that are brought low and weak, when the Spring begins, venture too far into the Swamps after the fresh Grass, where they perish; so that several Persons lose 10, 20, or 30 Head of Cattle in a Year: I observed this was much owing to their Inadvertency and Error in their way of Managing and Feeding them; for they get little Fodder, but as they think Corn being more Nourishing, feed them with their *Indian* Corn, which they give them Morning and Evening; they spend thus a great quantity of Corn, and when all's done, what signifies two or three Heads of Corn to a Beast in a Morning? It makes them only linger about the Houses for more; and after that sweet Food they are not so prompt to brouze on the Trees, and the course Grass which the Country affords. So that thus their Guts shrink up, and they become Belly-shot, as they call it. I advised therefore never to give them

them any thing in a Morning, whereby as-foon as they were fet forth of the Cow-pens, they would fall a feeding, and tho' they filled their Bellies only with such course stuff as had little Nourishment in it, yet it would keep out their Bellies, and they would have a better Digestion; and then when they were come home at Nighrs, to Fodder them, beginning with Straw and their courtest Fodder, which they would learn to eat by degrees, before they tasted that that was more delicate, and whilst their Digestion was strong, would yield them Nourishment to keep them still so, afterwards when the Winter pinched, their fine Fodder then would stand them in stead; and hereby they might preserve their weakest Cattle, by these Methods, and the help of the Wheat-patch. She, the Gentlemowan where I lived, saved all her Cattle, and lost not one. in Two Winters after, that I staid there; besides she saved above Twenty Barrels of Corn, as I remember that she told me she used to spend upon her Stock; and a Barrel of Corn is commonly worth Ten Shillings. Nay further, The last Spring she fed Two Beasts, a Bullock and a Cow, fat, upon her Wheat, with the addition only of a little boild Corn, and yet the Wheat was scarce eat down enough, but to return again to the nature of the earth, which may be pretty well gathered from what I have already said. I have observed, that at Five or Six yards deep, at the breakes of some banks, I have found veins of Clay, admirable good to make Pots, Pipes, or the like of, and whereof I suppose the *Indians* make their Pipes, and Pots, to boil their Meat in, which they make very handsomly, and will endure the Fire better then most Crucibles: I took of this Clay, dried, powdered, and sifted it; powdered and sifted potsheards, and glafs; Three parts, Two parts and One part as I remember, and therewith made a large Crucible, which was the best I yet ever tried in my Life; I took it once red hot out of the Fire, and clapt it
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immediately into Water, and it started not at all. The Country abounds mightily with Iron Oare, that as I have been assured by some upon tryal, has been found very good. There are Rocks thereof appear at the precipice of Hills, at the foot whereof there runs a River fit for a Forge, and there's Wood enough to supply it with Charcoal; as I have heard there was formerly some Persons undertook the Work, and when they had made but a small quantity of Iron, which proved very good, the *Indian* Massacre happened, and they being higher seated then the then Inhabited part of the Country, were all cut off, and the Works demolished; so that it has frightened others I think from the like attempt; besides, such a work requires a greater Fund, and Bank of Money to carry it on, then any there are able to lay out; and for Persons in *England* to meddle therewith, is certainly to be cheated at such a distance, some *Indians* brought *Coll. Bird* some Black Lead, whereof he has told me there was great store. There's very curious Talk towards the falls of *Rapahanock* River, which they burn and make a delicate white Wash of it. The Secretary of State *Coll. Spencer*, has assured me, there were Vitriolick or Alluminous Earths on the Banks of *Potomack*; and thus far of what my Memory supplies me, referring to the Earth, in the next place I shall give a short account of the Birds.

Of the BIRDS.

I had indeed begun once whilst I was in that Country to have made a Collection of the Birds, but falling sick of the Griping of the Guts, some of them for want of care Corrupted, which made them sling others away that I had thoroughly cured; for I was past taking care of them my self, there remaining but small hopes of my Life.

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There are Three sorts of Eagles, the largest I take to be that they call the Grey Eagle, being much of the colour of our Kite or Glead.

The Second is the Bald Eagle, for the Body and part of the Neck being of a dark brown, the upper part of the Neck and Head is covered with a white sort of Down, whereby it looks very bald, whence it is so named.

The Third is the Black Eagle, resembling most the *English* Eagle; they build their Nests much after the manner that Dr. *Willoughby* describes, and generally at the top of some tall old Tree, naked of Bows and nigh the River side, and the People fall the Tree generally when they take the young; they are most frequently sitting on some tall Tree by the River side, whence they may have a prospect up and down the River, as I suppose to observe the fishing Haukes; for when they see the Fishing Hawk has struck a Fish, immediately they take Wing, and 'tis sometimes very pleasant to behold the Flight, for when the Fishing Hawk perceives her self pursued, she will scream and make a terrible noise, till at length she lets fall the Fish to make her own escape, which the Eagle frequently catches before it reach the Earth or Water. These Eagles kill young Lambs, Pigs, &c.

The Fishing Hawk is an absolute Species of a Kings-fisher, but full as large, or larger than our Jay, much of the Colour and Shape of a Kings-fisher, tho' not altogether so curiously Feather'd; it has a large Crop, as I remember, there is a little Kings-fisher much the same in every respect with ours.

If I much mistake not, I have seen both Go's, Hawk, and Falcon; besides there are several sorts of the lesser Kind of Stannels.

There is likewise the Kite and the Ringtale.

I never heard the Cuckow there to my remembrance.

There's both a brown Owl and white Owl, much what as large as a Goose, which often kills their Hens and Poultry in the Night; the white Owl is a very delicate feather'd Bird, all the Feathers upon her Breast and Back being Snow-white, and tipp'd with a Punctal of Jet-black: Besides there is a Barn Owl much like ours; and a little sort of Scritch Owl.

There's both the Raven, and the Carrion Crow; I do not remember I ever saw any Rooks there, *Dr. Moulin* and my self, when we made our Anatomies together, when I was at *London*, we shew'd to the *Royal Society*, that all Flat-bill'd Birds that groped for their Meat, had three Pair of Nerves, that came down into their Bills; whereby as we conceived they had that acuracy to distinguish what was proper for Food, and what to be rejected by their Taste when they did not see it; and as this was most evident in a Duck's Bill and Head, I draw'd a Cut thereof, and left it in your Custody: A Duck has larger Nerves that come into their Bills than Geese, or any other Bird that I have seen, and therefore quafer and grope out their Meat the most: But I had then discover'd none of these Nerves in Round-bill'd Birds: But since in my Anatomies in the Country, in a Rook I first observed two Nerves came down betwixt the Eyes into the upper Bill, but considerably smaller than any of the three Pair of Nerves in the Bills of Ducks, but larger than the Nerves in any other Round-bill'd Birds; and 'tis remarkable these Birds more than any other Round-bill'd Birds seem to grope for their Meat in Cow-dung and the like: Since I have found in several Round-bill'd Birds the like Nerves coming down betwixt the Eyes, but so very small that had I not seen them first in a Rook I should scarce have made the discovery; in the lower Bill there are Nerves have much
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the same situation with the Flat-bill'd Birds, but very small, and scarce discernable, unless to the Cautious and Curious.

The Night Raven, which some call the *Virginia* Bat, is about the bigness of a Cuckow, feather'd like them but very short, and short Leg'd, not discernable when it flies, which is only in the Evening scuding like our Night Raven.

There's a great sort of ravenous Bird that feeds upon Carrion, as big very nigh as an Eagle, which they call a Turkey Bustard, its Feathers are of a Duskyish black, it has red Gills, resembling those of a Turkey, whence it has its Name; it is nothing of the same sort of Bird with our *English* Turkey Bustard, but is rather a Species of the Kites, for it will hover on the Wing something like them, and is carnivorous; the Fat thereof dissolved into an Oil, is recommended mightily against old Aches and Sciatica Pains.

I think there are no Jackdaws, nor any Magpyes; they there prize a Magpye as much as we do their Red Bird.

The *Pica Glandaria*, or Jay, is much less than our *English* Jay, and of another colour, for it is all blew where ours is brown, the Wings marbled as curiously as ours are, it has both the same Cry, and suddain jetting Motion.

There are great Variety and Curiosity in the Wood-peckers, there's one as big as our Magpye, with blackish brown Feathers, and a large Scarlet Tuft on the top of the Head: There are four or five sorts of Wood-peckers more, variegated with green, yellow and red Heads, others spotted black and white, most lovely to behold. There's a Tradition amongst them, that the Tongue of one of these Wood-peckers dryed will make the Teeth drop out if pick'd therewith, and cure the Tooth-ach (tho' I believe little of it, but look on it ridiculous)

diculous) yet I thought fit to hint as much that others may try ; for sometimes such old Stories refer to some peculiar Vertues, tho' not to all that is said of them.

There be wild Turkeys extream large; they talk of Turkeys that have been kill'd, that have weigh'd betwixt fifty and sixty Pound weight ; the largest that ever I saw, weigh'd something better than thirty eight Pound ; they have very long Legs, and will run prodigiously fast. I remember, not that ever I saw any of them on the Wing, except it were once : Their Feathers are of a blackish shining Colour, that in the Sun shine like a Dove's Neck, very specious.

Hens and Cocks are for the most part without Tails and Rumps ; and as some have assured me our *English* Hens after some time being kept there have their Rumps rot off ; which I'm the apter to believe, being all their Hens are certainly of *English* breed. I'm sorry I made no Anatomical Observations thereof, and Remarks about the Use of the Rumps in Birds, which at present I take to be a couple of Glands, containing a sort of Juice for the Varnishing the Feathers ; having observed all Birds have much recourse with their Bills to the Rumps when they dress their Plumes, whereby they scud through the Air more nimbly in their Flight.

Partridges there are much smaller than ours, and resort in Covies as ours do ; their Flesh is very white, and much excels ours in my mind, *Sed de gustibus non est disputandum.*

Their Turtle-doves are of a duskyish blew colour, much less than our common Pidgeon, the whole Train is longer much than the Tails of our Pidgeons, the middle Feather being the longest. There's the strangest Story of a vast number of these Pidgeons that came in a Flock a few Years before I came thither ; they say they came through *New England, New York and Virginia,*

ginia, and were so prodigious in number as to darken the Sky for several Hours in the place over which they flew, and brake massie Bows where they light; and many like things which I have had asserted to me by many Eye-witnesses of Credit, that to me it was without doubt, the Relaters being very sober Persons, and all agreeing in a Story: nothing of the like ever happen'd since, nor did I ever see past Ten in a Flock together that I remember. I am not fond of such Stories, and had suppress'd the relating of it, but that I have heard the same from very many.

The Thrush and Feldefire are much like ours, and are only seen in Winter there, accordingly as they are here.

Their Mocking Birds may be compared to our Singing Thrushes, being much of the same bigness; there are two sorts, the Gray and the Red, the gray has Feathers much of the colour of our gray Plovers with white in the Wings like a Magpye; this has the much softer Note, and will imitate, in its singing, the Notes of all Birds that it hears, and is accounted much the finest Singing Bird in the World. Dr. *Moulin* and I made in our Anatomy many Observations of Singing Birds to this effect: The Ears of Birds differ much from those of Men or Beasts, there's almost a direct passage from one Ear to the other of Birds, so that prick but the small Membrane called the Drum on either Ear, and Water poured in at one Ear will run out at the other: But this is not all, but what is much more remarkable, they have no Coclea, but instead thereof there's a small Cocleous or twisting Passage that opens into a large Cavity, that runs betwixt two Sculls, and passes all round the Head, the upper Scull is supported by many hundreds of small Thred-like Pillers or Fibers, which as we supposed had another use also, to brake the Sound from making any confus'd Echo, and to make it one and distinct; this passage

passage we observed betwixt the two Sculls was much larger in Singing Birds than in others that do not sing, so very remarkable that any Person that has been but shew'd this may easily judge by the Head what Bird is a Singing Bird, or has aptitude thereto, tho' he never saw the Bird before, nor knew what Bird it were: This has often made me reflect how much the Modification of Voices depends upon the acuracy of the Ear, and how deaf Persons become dumb: And since I have observed that many Children that have an acute Wit enough that are slow of Speech, that is long before they speak are much longer before they can pronounce those Letters that are sharps, as *g. b. r.* and never have an aptitude to learn to sing. Hence I judge that Songs that have many Sharps in them are the difficultest to sing well, and discover any Person's Skill upon the tryal of Musick most. This I suppose only, having no Skill in Musick my self, nor having ever discoursed any Person about it, as I remember we shew'd some of these things to the *Royal Society*, and I drew some Cuts thereof, and gave the Doctor upon promise that he would put these and many other our joynt Observations in Print, but I hear he is since dead. I have Anatomized most sorts of Creatures, and never found any Four-footed Creature with an Ear like a Bird, unless a Mole; and a Mole has an Ear much like them, with a very thin double Scull, and great Cavity like a Bird, and is very acute of hearing, the Scull by reason of the large Cavity is very slender and easily crush'd, so that a Mole is quickly kill'd with a bruise on the Scull like a Lark, and upon the bruise the Membranes of the Scull turn black; whence *Segerus* mistake *Membranæ Cerebri in superficie exteriori omnino nigræ visæ*: But when I have taken care not to bruise the Scull the Membranes were not black at all, both *Segerus* and *Severinus* I think had some perceptions of the different Structure of a Mole's Ear, but not any thing

thing of its Analogy to a Bird's Ear ; they speak of a Bone *Egrecie pumicosum* : And *Segerus* says there's a *Ductus ad ossis usque petrosi cavitatem protensus, plurimis fibrillis Membraneis annectabatur*. But to return, this Mocking Bird having its Name from *Mimicking*, all other Birds in singing is a wonderful mettled Bird, bold and brisk, and yet seems to be of a very tender Constitution, neither singing in Winter, nor in the midst of Summer, and with much difficulty are any of them brought to live in *England*.

The Red Mocking is of a duskyish red, or rather brown ; it sings very well, but has not so soft a Note as the gray Mocking Bird.

Of *Virginia* Nightingale, or red Bird, there are two sorts, the Cocks of both sorts are of a pure Scarlet, the Hens of a Duskyish red ; I distinguish them into two sorts, for the one has a tufted Cops on the Head, the other is smooth feather'd : I never saw a tufted Cock with a smooth headed Hen, or on the contrary ; they generally resorting a Cock and Hen together, and play in a Thicket of Thorns or Bryars in the Winter, night to which the Boys set their Traps, and so catch them and sell them to the Merchants for about Six Pence apiece ; by whom they are brought for *England* ; they are something less than a Thrush.

There's a Bird very injurious to Corn, they call a Blackbird ; I look on it a sort of Starling, for they cry something like them but do not sing, are much what of the same bigness, have Flesh blackish like theirs ; they resort in great Flocks together, they are as black as a Crow all over their Bills and all overly some of them have scarlet Feathers in the Pinions of their Wings, *Quære* whether a distinct Species.

They have a Lark nothing differing from our common Lark ; they have another Bird which they call a Lark that is much larger, as big as a Starling, it has a
soft

soft Note, feeds on the Ground; and as I remember has the Specific Character of a long Heel, it is more inclined to yellow, and has a large half Moon on its Breast of yellow; if it have not a long Heel, *Quare*, Whether a Species of the Yellow-hammer.

They have a Martin very like, only larger than ours, that builds after the same manner. The honourable Col. *Bacon* has remarked for several Years, that they constantly come thither upon the Tenth of *March* one or two of them appearing before, being seen hovering in the Air for a Day or two then go away, and as he supposed return'd with the great Flock. The Colonel delighted much in this Bird, and made like Pidgeon holes at the end of his House with Boards purposely for them.

Their Swallow differs but little from ours.

They have a Bird they call a Blew-bird, of a curious azure colour about the bigness of a Chafinch.

There be other sorts of Goldfinches variegated with red, orange and yellow Feathers, very specious and beautiful.

Sparrows not much different from the *English*, but build not in the Eaves of Houses that ever I saw.

The Snow-bird which I take to be much the same with our Hedge Sparrow; this is so called because it seldom appears about Houses but against Snow or very cold Weather.

The Humming Bird that feeds upon the Honey of Flowers: I have been told by some Persons, that they have kept of these Humming Birds alive, and fed them with Water and Sugar; they are much the smallest of all Birds, have long Bills and curious coloured Feathers, but differ much in colour.

Hearons three or four several sorts, one larger than the *English*, feather'd much like a *Spanish* Goose.

Another

Another fort that only comes in Summer Milk white, with red Legs very lovely to behold.

The Bittern is there less than in *England*, and does not make that sounding Noise that ever I heard.

Curlews something less than our *English*, tho' bigger than a Wimbrel.

The Sandpiper much resembling the *English*.

The Snipe, two sorts, one resembling ours, the other much less.

The Tewits are smaller than the *English*, and have no long Toppins, but just like a young one that begins to flie.

There are great numbers of wild Swans.

Wild-geese and Brent-geese all Winter in mighty flocks, Wild-ducks innumerable, Teale, Wigeon, Sheldrakes, Virginia-Didapens, the Black-diver, &c.

In my return home for *England*, May 1686. off of the Banks of *New-found-Land*, when we were according to account, a Hundred Leagues from the Shoar, we saw several prodigious floating Islands of the Ice, no less to our wonder than Terror, for they were very dangerous: I got the Master to sail one day as nigh one of them as we securely durst, which we judged to be full a League in length, and was higher above Water than the top of our Main-mast; the Snow drove to and fro upon it as upon a large Plane. There was a great Flock of small Black-divers, that were not much bigger than a Feldfire, came to us a little before, but all of them then left and betook themselves to this Island of Ice. They dived the constantly't, and the longest at a time of any Bird that I ever saw. We saw, as I remember, nigh Thirty of these Islands of Ice. Captain *Rider* being some few days later in his Passage, and bearing more to the *Nore*, told me, he saw many more of these Islands of Ice, and some much larger.

There are in *Virginia* a great many Cormorants; several sorts of Gulls, and in about the Bay many Bannets.

Thus much for the Birds.

Tours, &c.

II. *Some Queries concerning the Nature of Light, and Diaphanous Bodies. Proposed to the Royal Society by E. Halley.*

THE late Curious Book of Mr. *Hugen's* having revived the Disquisitions that have formerly been made about the Nature and Phænomena of Light, I thought it not amiss to propose some Difficulties that have occur'd to my Thoughts upon this Subject, by way of Query: Which may perhaps not seem unworthy of the Consideration of this Honourable Assembly, *viz.*

1. In what consists the Transparency of Glass, Chrystal, Water, &c. And whether the Notion of *right Pores* be enough to answer all the Appearances of it, especially those of Refraction, and of the Transparency of Bodies in all Positions; whereas the Rectitude of Pores seems to argue an orderly or regular Position of the constituent Parts, according to the three Dimensions?

2. Why in Bodies that have much more Pores than Glass or Water; as Deal-shavings or brown Paper, the Passage of Light is wholly obstructed, though several gross Particles will penetrate them?

3. Whether or no the Light is easier propagated through Glass, Water, &c. than Air or Æther, as *des Cartes* and Mr. *Hook* have maintained; and wherein Mr. *Hugens* differs from them, asserting that the Beams