

VIII. *A Letter from Mr. James Simon, of Dublin, to Martin Folkes, Esq; Pr. R. S. concerning the Petrifications of Lough-Neagh in Ireland: To which is annexed a Letter from the Right Rev. Dr. George Berkeley Lord Bishop of Cloyne to Tho. Prior, Esq;.*

S I R,

Read Feb. 9.
1746-7.

IN my last I mention'd some Petrifications I had sent in a Box to *Solomon Dayrolles, Esq; F.R.S.* to be deliver'd to you, and presented to the *Society*: I mention'd, at the same time, that I had made some few Remarks and Observations on these kind of Petrifications, commonly called *Lough-neagh* Stones; I hinted, that, if the bad State of my Health would permit me, I would send you these Remarks, which, tho' my great Heaviness and Dizziness continue, I have drawn up, during some favourable Intervals; and beg Leave to lay them before you, that you, and some of your Friends, may examine them strictly, and be kind enough to redress the Mistakes, however numerous. I search for the Truth, am willing to improve, and will most thankfully receive Advice. To proceed:

Most of the antient Writers, that have treated of *Ireland*, have made mention of the peculiar Qualities of *Lough-neagh* of turning Wood into Stone; some

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of

of them (a) have gone so far as to say, that it would turn that Part of the Wood which was in the Mud into Iron; the Part in the Water into Stone, whilst the Part above Water remained Wood.

Some later Writers, particularly Messieurs *William Molyneux*, *Francis Nevill*, and *Edward Smyth*, and from them the late learned Dr. *Woodward*, (b) the Author of the Notes on *Varenius's* Geography, and others (c), seem rather to think, that this petrifying Quality doth not lie so much in the Lake itself, as in the Ground near or about it.

Mr. *Edw. Smyth* (d), who enlarges the most on this Subject, and seems to have led the others, and drawn them into his Opinion, tells you, “ That
“ no Experiment or Observation yet made, that
“ he could hear of, could prove that this Lough has
“ really the Quality of petrifying Wood, or that the
“ Water doth any way help or promote the Petri-
“ fication.” He there gives you an Example of a Gentleman of Worth and Credit, “ who had fixed
“ two Stakes of Holly in two different Places of
“ the Lough, near that Place where the *Upper Bann*
“ enters into it, and that the Parts of the Stakes
“ which

(a) *Boetius* Hist. Gem. et Lap.

(b) Catal. of *English* Fossils, Part II. p. 19.

(c) Sir *James Ware's* Antiq. by *Walt. Harris*, p. 227. Edit. 1745, folio.

(d) Afterwards Bishop of *Down*. See Phil. Transf. N°. 174.

“ which had been washed by the Water for about
 “ 19 Years, yet remained there without any Altera-
 “ tion, or the least Advance to Petrification.”

Another Reason for his doubting of this Quality is, “ That tho’ it is reported that the Water hath
 “ this Virtue, especially where the *Black-Water* dis-
 “ charges itself into the Lake, yet that, as it seems
 “ evident, from the Nature of liquid Bodies, that
 “ any Virtue received in one Part must necessarily
 “ be diffused thro’ the Whole, at least in some de-
 “ gree; therefore (saith he) there is good Reason
 “ to believe, that the Water is wholly destitute of
 “ this petrifying Quality :” But a few Lines lower
 he tells you (a), “ That he had sufficient Ground to
 “ conjecture, that other Wood as well as Holly had
 “ been petrify’d about this Lough; because some
 “ Fishermen, being Tenants to a Gentleman from
 “ whom he had this Relation, told him, that they
 “ had found buried, in the *Mud* of this *Lough*,
 “ great Trees, with all their Branches and Roots
 “ petrify’d; and some of that Bigness, that they be-
 “ lieved they could scarcely be drawn by a Team of
 “ Oxen; that they had broke off several Branches
 “ as big as a Man’s Leg, and many bigger, but could
 “ not move the great Trunk.”

I suppose Mr. *Smyth* (or the Gentleman his Friend)
 saw these Branches, and was thereby convinced of
 their

(a) *Ibid. ut supra.*

their real Petrification, as he was by the Bulk of those Trees of their being Oak, and not Holly; “because, says he, no other Tree in that Country, these excepted, grows to that prodigious Bigness; at least it is certain, that Holly never grows to that Bigness.”

But how Mr. *Smyth* came to be convinced, that that these Trees were Oak, and not Holly, and yet was not convinced of the petrific Quality in some Parts of the Lough, tho’ these Trees were found petrified in its Mud, is amazing to me: For, if a Team of Oxen could scarcely draw them from thence, it was as hard, in my Opinion, to draw them from any adjacent Ground (where they must have grown, lain, and be petrified) into the Mud of the Lake, where they were afterwards found: For it must be supposed, that either these Trees grew on the Banks of the Lake, and, thro’ Age, or any other Accident, fell into the Water or Mud, and were there petrified; or that, with great Labour and Expence, they were brought into it from some adjacent Ground, after their actual Petrification, which is hardly to be supposed.

Mr. *Smyth* (a) tells you farther, that “Two Gentlemen of the North (of *Ireland* where this Lough lies) had told him, that they had seen the same Body, partly Wood, and partly Stone; but the only Reason for thinking so, being the Diversity of Colours, which might well enough proceed from several Degrees of Petrification, we may properly
“ think

(a) *Ibid. ut supra.*

“ think them deceived ; for they made no Experiment
 “ on that Part which they reputed Wood. The Bark
 “ is never found petrified, as I am informed by a
 “ diligent Inquirer ; but often something rotten about
 “ the Stone, answerable to the Bark.”

Mr. *Smyth* I think contradicts himself no less in his last Supposition than he did in the first. His Friends assured him, that they had seen one or more of the *Lough-neagh* Stones partly Wood and partly Stone ; but they were deceived, he says : The Diversity of Colours, by which they judged one Part of the Stone by its Colour to be Wood, and the other Part likewise, by its Colour different from the other, to be Stone, were no more than different Degrees of Petrification. What are we to understand by these different Degrees of Petrification ? by this something rotten about the Stone often found ? if not, that some Part of the Wood was actually turned into Stone, some other Part in a Degree less petrified, and some other Part not petrified at all, as these Gentlemen assured him : The Diversity of Colours, Seeing and Feeling, was enough to convince them, and to determine the Point.

As to his Assertion, That, because the Water of this Lake has not every-where, and in every Place, that petrescent Virtue, it must therefore be a good Reason to doubt of its having that peculiar Quality in some particular Places, I think it may be denied for these Reasons ; 1st. Because a Spring, tho’ ever so much impregnated with petrific, mineral, or metalline Particles, issuing out in some particular Place of the Lake, can no more communicate its petrifying Virtue to the Waters of the whole Lake, than the
 River

River *Thames* its Sweetness to the Sea, and make all its Water fresh.

Secondly, Because that if this lapidescent Quality was equally diffused thro' the Water of the whole Lake in a Degree sufficient to turn a whole Tree, or any of its larger Branches into Stone, in all Parts of the Lake without Exception, that petrescent Virtue must act equally on all the Plants or Vegetables whatsoever that grow in the Lake, and upon all other Bodies, Gravel, Sand, Mud, and Clay, that are in, or are daily brought into it; and, at last, by a general Aggregation, Agglutination, and Attraction of these different Bodies together, the whole Bottom of the Lake, nay the whole Lake itself, by the different Degrees of Coalition of Particles, must become a solid Body; unless you would suppose, that this petrific Quality has no Power on any other Matter but Wood, which is contrary to Experience, Rushes, or other Plants, having been found petrified on the Shores of this Lake, as also Shells, Clay, and Sand petrified in different Shapes, of all which I have Specimens.

“ The Earth, says the great *Robert Boyle* (a) harbours different Kinds of petrescent Liquors, and many of them impregnated with one sort of Mineral or other.” There are no Springs, no Waters, but are more or less impregnated with such mineral and saline Particles; which appears from the most limpid; which, after Evaporation, still in the *Residuum*,

(a) *R. Boyle*, of the Origin and Virtues of Gems.

fiduum gives some Particles of Salt together with some stony and mineral ones.

I have found by Experience, that petrifying Springs are generally impregnated, some with calcarious and Particles of other Stones, and others with ferrugineous and vitriolic Particles. Those of the stony or calcarious Kind, I have observed, when they drop on Wood, or other Vegetables, act on them for the most part by Incrustation, having different Degrees and Periods for their respective Incrustations and Coalitions, which yet stick close to one another: They seldom turn the Wood into Stone; but, sticking to the Wood, Plants, &c. coagulate on it, and by degrees cover it with a Crust of a whitish Substance of different Thickness, whereby the Wood is immersed or wrapped in a stony Coat, which, if it be broken before the Wood be rotten, you will find it in the Heart of the Stone or Incrustation, as is seen in those Petrifications at *Maudlin Meadows* in *Gloucestershire*, at *Hermitage* near *Dublin*, and many other Places: Or, if the Wood be rotten, you will find a Cavity in the Stone, which very often is filled by a subsequent Incrustation or Petrification; the stony Particles then taking the Place of the rotten Wood.

Sometimes indeed, these Waters, permeating the Pores of the Wood either longitudinally or transversely, insinuate themselves therein, fill them up with their stony Particles, swell, and, by their burning or corroding Quality proceeding from the Lime-Stone, destroy the Wood, and assume the Shape of the Plant, the Place whereof they have taken.

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These

These kind of Petrifications generally ferment with Acids and Spirit of Vitriol, and, by Calcination, may be reduced to Lime.

Ferrugineous or metallic petrifying Waters mostly act by insinuating their finest Particles thro' the Pores and Vessels of the Wood, or other Vegetables, without increasing their Bulk, or altering their Texture, tho' they greatly increase their specific Gravity : And such is the petrified Wood found in or on the Shores of *Lough-Neagh* ; for it doth not shew any outward Addition or Coalition of forcing Matter sticking to or covering it (except in some Places, where a thin slimy Substance, taken notice of hereafter, is sometimes observed), but preserve the Grain and *Vestigia* of Wood ; all the Alteration is in the Weight and Closeness, by the mineral Particles pervading and filling the Pores of the Wood : These Stones, or rather Wood-Stones, do not make the least Effervescence with Spirit or Oil of Vitriol, nor *Aqua-fortis* ; which shews, that they are impregnated with metalline Particles, or stony ones, different from the calcarious Kind ; and may be the Reason why the petrified Wood, mentioned by *N. Grew* (*a*), made no Ebullition, at which it seems he was surprised (*b*). These Stones I could not reduce into Lime by the most intense Fire, nor,

(*a*) Reg. Soc. Mus. p. 270.

(*b*) This contradicts an Observation of Mr. *John Beaumont* (*Phil. Transf.* N^o. 129. p. 731.), That mostly mineral Stones will stir with Acids ; whereas all those that I have tried, whether *Englisb* or *Irisb*, did not at all stir with Acids.

nor, with proper Ingredients, procure a Vitrification or Fusion (*a*).

Altho' Mines have not perhaps been discovered near the *Lough*, I have Reason to believe that there are such in its Neighbourhood, from the great Quantity of Iron-Stones found on its Shores, and Places adjacent to it, and from the yellowish Ochre and Clay to be met with in many Places near it. Of these Iron-Stones, which are very ponderous, outwardly of an ocheryish-yellow Colour, and inwardly of a reddish brown, I have calcined many, and do find the Powder of all to yield strongly to the Magnet.

Gerald Boate (*b*) mentions an Iron Mine, in the County of *Tirone*, not far from the *Lough*, and such others at the Foot of *Slew-Gallen* Mountains.

That Mines are generated and found in the Bowels of Hills and Mountains, is obvious to any that have the least Knowledge of Metallurgy; and that Springs also proceed from Mountains, is no less obvious; therefore should a Spring happen in the Bowels of any of these Mountains to run thro' a Vein of Mineral of any kind soever, it will wash and dilute some Parts of such Mineral, impregnate itself with the unctuous, saline, and metallic Particles of such Mines, and convey them along with its Water; and if in its Way, whether under-ground, or at its issuing
out

(*a*) Stones of the calcarious Kind turn to Lime by Calcination, and ferment with Acids; but other Kinds, such as Slate, Fire-Stone, Free-Stone, Rag, Grill, &c. will do neither, as Experience has hitherto testified.

(*b*) *Nat. Hist. of Ireland*, *Dub.* 1726.

out of the Cliffs of a Mountain, of the Sides of a River, or of the Lake in Question; or whether it rises under Water, in the middle of such a River or Lake in any particular Place, and in its Course meets with Wood, Vegetables, or any other lax Bodies (lodged in the Mud or Gravel), whose Pores, by the natural Heat of the mineral Streams, or any other Accident, being open and duly prepared, these metallic *Molecule* and saline Particles will penetrate thro', insinuate and lodge themselves in the Pores and Vessels of such Wood, &c. fill them up, and, by degrees, turn them into Stone; (a) " There
 " being some of these *Juices lapidescent* of so fine a
 " Substance, yet of so petrifying a Virtue, that they
 " will penetrate and petrify Bodies of very different
 " Kinds, and yet scarce, if at all, visibly increase
 " their Bulk, or change their Shape and Colour."

That such Springs there are, hidden under the Water or Mud of this Lake, I hope will appear probable, from what has been said, and perhaps evident, from the Account I have since received, that, in the great Frost of 1740, the Lake was frozen over so as to bear Men on Horseback, yet several circular Spaces continued unfrozen. But how the several Attempts, made, as mentioned, by Messieurs *Molineux*, *Nevil*, and *Smyth*, to procure Wood half-petrified (by fixing Stakes of Holly in the Lake, which received no Alteration) proved unsuccessful, the Reason I think is plain, because they were not fixed in the proper Place, *viz.* the Course or Vein of the

(a) *Rob. Boyle, of Gems*, p. 124. 8vo.

the Spring, where nothing but Chance could have directed them. This petrified Wood is often found in different Places on the Shores of the *Lough*, but generally in greater Plenty when the Water has been disturbed by great Storms; which makes it impossible to fix on the particular Place where the petrifying Juice most prevails; except a Tree, or any large Piece, should be found so fixed as to resist the Force of the Waves.

Mr. *Smyth* (a) makes this further Observation:
 “ This Virtue is certainly, if *not only*, in the Ground
 “ or Soil, he judges (says he) for these Reasons;
 “ That there are many Stones turned up daily, especially at their breaking up new Ground, which
 “ we cannot in any Probability think were brought
 “ thither; they are often found at two Miles Distance from the *Lough*, seldom farther, in great
 “ Numbers, and very deep in the Ground; and a
 “ Gentleman (on whose Credit I received the Information) saw a Stump of a Tree digg’d out of
 “ the Ground at a small Distance from the *Lough*,
 “ which, by handling of it, he found to be petrified.
 “ He assured me, the Roots and all were Stone, and
 “ altogether like those Stones that are ordinarily
 “ found, and go by the Name of *Lough-Neagh*
 “ Stones. This Gentleman was of Opinion, these
 “ were *Lapides sui generis*, till this Observation
 “ convinced him: And that these Stones were once
 “ Wood, is, I think, very certain; for they shew the
 “ plain *Vestigia* of Wood; they likewise burn, and
 “ cleave:

(a) Philos. Transf. *ibid.* ut *supra*.

“ cleave: Filings of this Stone thrown into the Fire
 “ emit a fragrant Smell; and they cut kindly with
 “ a Knife, tho’ not so easily as other Wood (a)

That this petrific Quality is in some peculiar Parts of the Lake, I have endeavour’d to prove; that it is or may be in some peculiar Places of the adjacent Ground, I grant; tho’, as yet, I could not procure any of those Stones found in the Ground, with Wood continuous. Such as I have, or have seen, are of the white Whetstone-kind, and seem to be Holly or Ash, petrified by some strong nitrous and stony Particles; for, in a Solution of it in *Aqua fortis* and Oil of Vitriol, it leaves no Tincture, but the Liquor growing muddy, like Pipe-Water after great Rains, therefore shews, that they are not so strongly impregnated with metalline Particles, as those Stones found in or on the Shores of the Lake.

I need not add any more, to shew how mineral Springs may petrify Wood, or any other Vegetables underground; but as to whole Trees found petrified and buried within a small Distance from the Lake, I should think that the *Lough* might have been formerly broader than it is at present, or perhaps hath lost on one Side what it has gain’d on the other; by which means, what is now dry Ground was formerly under Water, and the other Side *vice versa*: If so, such Trees as are found underground might have been petrified in that Part which was overflow’d, and is now dry Land.

Mineral

(a) An Answer to this, see in the Description of the City of *Down*, p. 162. The Argument is confuted by the desired Proof.

Mineral Steams or Exhalations, being highly saturated with stony and mineral Particles, are often found to have a petrifying Virtue, as is seen at the Bath called *Green Pillars* (a) in the City of *Buda* in *Hungary*. If such Steams shou'd, in certain Places, find or force their Way thro' the Sand or Pores of the Earth, they may operate on Wood, &c. buried in the Ground, permeate its Vessels, and, by degrees, turn it into Stone; and such, I apprehend, is the most probable, if not the only Reason, that can be assigned for those Petrifications of Wood found in Sand, as mentioned by *Boyle* and *Plot*.

It may be observed, that the finer the lapidific Particles are, the more beautiful and natural the Petrification will appear; such is a petrified Root of the Flag or *Iris sylvestris* in my Possession, which is solid Stone at the Bottom, the Pith being turned into a white or sparry Substance, and the growing Knots of the Root, tho' petrified, preserving their Skin brown, and somewhat flexible. This *Phænomenon* indeed has been lately solved in the Description of the County of *Down*, p. 162. The *Lusus Naturæ*, or Sportings of Nature, is a general Solution, too often brought in, and comes in very *à propos* to answer Queries concerning Petrifications, such as Wood, Shells, Worms, &c. If the Shells, or other like petrified Bodies (found in Marble or Lime-Stone) which preserve the most exact Resemblance of the Fish or Body they represent, were not formerly a real Fish, Shell, Worm, &c. how comes it

(a) *Philos. Transf.* N°. 59. p. 1049.

it that such Shells and other Bodies are found unpetrified in Marble, Lime-Stone, Rock, Marl, or any other Stone? The Right Reverend Dr. *Robert Clayton*, Bishop of *Clogher*, hath shewn me in his Collection a Piece of *Italian* Marble, where petrified Shells are seen, and others no way petrified, but that may be crumbled to Dust with the Fingers. I have a Stone (which I found lately in the River *Liffy* at *Chapel-Izod*) of the *Lapis vermicularis* Kind, the Surface whereof, on one Side, is cover'd with a Number of small petrified Worms or Plants; Part of which, sticking and continuous to the stony ones, are still soft and flexible.

To return to the *Lough-Neagh* Petrifications; I received last Summer, 1745. from my worthy and ingenious Friend the Reverend Mr. *Richard Barton*, about 30 of these Stones, found on the Shores of the Lake, some in the Water, some in the Mud, some in the Sand, and others in a yellowish Clay. That they were petrified in the Lake is probable, but whether in the Water, Mud, Sand, or Clay, is no matter; for certain it is (to use Mr. *Smyth's* own Words), that they were not brought hither from any Distance, such as 2, 4, 6, 8 Miles, after being dug out of the Ground, and then thrown and dispersed on the Shores of the Lake: And besides, the Difference in the Colour of these Stones, those found in the Lake, and those found in the Ground somewhat distant from it, is such that they cannot well be mistaken one for the other. Those found in the Ground are white, and of a looser Texture; those found in or on the Shores of the Lake are black, closer, and heavier. That these last were petrified
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by a mineral Spring, appears from the few following Observations. — They do not ferment with Acids, Spirit and Oil of Vitriol. The Solution of this Stone in *Aqua fortis* gives a beautiful red Tincture, and in Oil of Vitriol leaves a Tincture of a brown dark Red. The woody Part of these Stones in *Aqua fortis* also gives a red Tincture, tho' somewhat paler; and, when taken out of the Liquor, shews red Spots in its Pores, which I take to be Particles of Iron and Sulphur: These Spots, when the Wood began to dry, became black; and the Wood, when dry, turned of the Colour of a deep red *Jesuit's-Bark*.

In some of these Stones, several curious Veins, of a red and bluish Colour, are very remarkable, being intermixed with black and white *Striae*.

Having broken some of these Stones, I found in the Inside a kind of white, and several Clusters of small white and black angular Crystals, which thro' the Microscope appear transparent, and of different Shapes, but mostly hexagonal. I discovered such Crystals in some of the woody Part of these Stones.

One Piece of a white Stone I calcined in a Crucible for 24 Hours, but could neither reduce it to Coal or Lime. The Powder yielded faintly to the Magnet. This Stone was found in the Ground at some Distance from the Lake.

One Piece of a black Stone, found in the Lake, I likewise calcined for 24 Hours, and could not reduce it to Coal or Lime: The Powder yielded briskly to the Magnet.

I calcined one Piece of another Stone, about one Inch thick, for about 4 Hours, in an intense Fire,

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until it grew as red as it could be, when I took it out of the Crucible. I observed several Veins (not discernible before) of a ferrugineous Matter, about $\frac{1}{10}$ of an Inch thick, and when reduced to Powder, it applied strongly to the Magnet.

In other Stones I found some Veins of Wood, about one and two Inches thick, no way petrified, tho' the Stones were every way so outwardly.

Some of that woody Part I also burnt in a Crucible; it emitted a bluish Flame, as if impregnated with Sulphur, and had the strong Smell of burning Charcoal. When burnt to a Coal, and reduced into Powder, it faintly yielded to the Magnet.

How Wood happens to be found in these Petrifications, found and untouch'd, is somewhat surprising, and to account for it not very easy. It may be attributed to this, that the Texture of the Wood is not every where equal; especially where Knots happen, that Part is much harder and closer than any other; and if the perrescent Particles should be once stopped, they will fix there, coagulate, and go no further; by which means that Part of the Wood will remain free from Petrification, while the rest will be turned into Stone; or the Pores of the Wood may happen in some Places, and in the very Heart of it, to be so full of a resinous Matter, that it will keep out the petrific Juices, and hinder their further penetrating into them equally: To this may be attributed the strong Smell of this Wood when burning; and the more so, as I suspect that most of this petrified Wood was Fir, there being a good deal of that kind found daily in Turf-Pits near the Lake; some not above twenty Yards Distance from it; and the last Piece of Wood and Stone continuous that I have

have received, appearing by the Grain to be of that kind of Wood.

Lastly, the petrific Juices may happen to be so strongly impregnated with Salts and Metal, or any other mineral Particles, that they will immediately swell and fill the minute Pores of the Wood, and, by a sudden Coalition, hinder their further penetrating into it; which seems to appear clearly from some Cavities in one of these Stones, which I suppose to have been Worm-Holes, and which were no way filled by the petrescent Liquor which was stopped round it; all the Sides of this Hole being overlaid with small brown Crytals, occasioned by the Evaporation of the aqueous Parts, and their being stopped and soaked by the neighbouring Stone or Wood.

The woody Part of these Stones, as I have observed, will burn to a Coal, and emit a Flame: That Part intermediate betwixt the Stone and Wood, and which is but partly petrified, being harder than Wood, and softer than Stone, will grow red in the Fire, emit a kind of Flame, or rather Sparks of Fire, but doth not consume, and is properly what Dr. *Grew** calls incombustible Wood. The stony Part doth not burn, tho' it grows as red as Coal.

I calcined another of these Stones, weighing 1 oz. 13 *penywt.* 12 $\frac{1}{4}$ *gr.*; after burning 4 Hours it weighed but 1 oz. 10 *penywt.* 8 $\frac{1}{4}$ *gr.* and lost 3 *penywt.* 4 *gr.*; which proceeds, I suppose, from unpetrified Veins of Wood in the Heart of the Stone, which were destroyed by the Fire, as in the Crucible it emitted now-and-then a bluish Flame, as Brandy doth when burning. This Stone, when taken

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* *Mus. R. S.* p. 269.

out of the Crucible, and cooled, had the Colour of Iron, when heated in, and cooled from the Forge.

Part of another Stone, which, by visible Veins of Ore, appears to contain a good deal of Iron, I likewise calcined for four Hours; the Powder yielded most surprisingly to the Magnet; so that it appears, that the Opinion of *Nennius*, *Boetius*, and other ancient Writers, was not absolutely destitute of Foundation.

The white Wood-Stones are generally found in the Ground at 2, 4, 6, and 8 Miles Distance from the Lake, and sometimes very deep in the Earth.

The black ones are always found in the Water, or on the Shores of the Lough; sometimes at the Mouths of Rivers or Rivulets that empty themselves into it; but those with Wood continuous have not yet been found above 20 Yards Distance from the Water of the Lake; that is, where the Water reaches in the Winter, or at other times.

Some of these Stones are outwardly covered with a thin white Substance, which hath run thro' the Pores of that Part of the Stone that was exposed to the Air, and not covered by the Water, Mud, or Clay; and on some others it is rather an Incrustation of that white Substance, which I take to be the slimy, unctuous, saline Parts of the petrescent Juices that filled the outward Pores of the Stone, or coagulated on it. This white Part scraped, and put into a Crucible in a violent Fire, could not be reduced to Lime, tho' it grew red as Coal. This Powder calcined appeared thro' the Microscope quadrangular, like Grains of Salt; which makes me suspect, that these Petrifications contain, besides metalline, a great deal

deal of saline Particles, whose Sides being strongly attracted to each other, and closely joined, hinders the Fire from expanding the Pores of these Stones, and their being reduced to Lime.

This black Stone, when broken, appears thro' the Microscope very beautiful, and like Cloth of Silver, the Pores and Vessels of the Wood being filled with white minute Crystals.

Of these Stones I have some with Wood outwardly continuous; others with Wood inwardly; one, the least Part whereof is Stone, the rest Wood; another *vice versa*; another intirely Wood, except a thin Coat of Stone on one Side, which appears to be the very Bark; one Stone which at one End distinctly shews the annual Ringlets of the Wood; one that shews the Wood, before it was petrified, had been bent, and partly broken, the Fissure being filled with a sparry Matter, and appears plainly from the present Appearance and Position of the Fibres of the Stone. Some of these Stones strike Fire with a Steel, and others, by a strong Collision, emit a Train of Sparks.

Some of these Stones shew the Grain of Holly, Ash, and Fir. I have but one Piece of Oak petrified, easily distinguished by its Grain; it shews the very Knots of the Wood where young Twigs were cut; and has a Hole made thro' it before it was petrified.

As for these Stones being fit for sharpening or setting of Razors, &c. the black ones are rather too hard, and the white ones too soft. The Whetstones or Hones, vulgarly so called, which are sold for *Lough-Neagh* Stones, are none of these, but of a soft gritty kind, and found near *Drogheda*.

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When these Stones with Wood continuous are taken out of the Water, Mud, or Clay, the woody Part dries, cracks, and falls away; which is the Reason why few can be well preserved; and besides, every body, unwilling to trust their Eyes, will touch and scrape the Wood, and, by these means, destroy the most curious Part of the Stone.

The curious Gentleman above-mention'd, who hath already begun, and intends, at his Leisure, to take an accurate Survey of the Lake, will, I hope, be able to give a more just and satisfactory Account of its petrifying Virtue than I possibly can; my Design in the present Attempt being only to pave the Way, and induce others to make further Experiments in search of Truth, and for improving natural Knowledge. My Habilities do not answer my Good-will; therefore I hope Defects in the Performance and Language of a Foreigner, will be excused. I should be very proud, that these few Remarks could deserve your Approbation, and of your Friends; and shall be glad to hear of its Success.

Dublin, June 10.
1746.

S I R,
Your most humble,
and obedient Servant,

James Simon.

P.

P. S. I had lent the above Papers to the Bishop of Cloyne, from whom I received them Yesterday, with the original Letter to *Thomas Prior, Esq;* of which follows the Copy.

A Letter from the Right Rev. Dr. George Berkeley, Lord Bishop of Cloyne, to Tho. Prior, Esq; in Dublin.

Cloyne, May 20. 1746.

Dear Sir,

I HERE send you back the curious Dissertation of Mr. *Simon*, which I have perused with Pleasure; and tho' Variety of Avocations gives me little Time for Remarks on a Subject so much out my Way, I shall nevertheless venture to give my Thoughts briefly upon it, especially since the Author hath been pleased to invite me to it by a Letter.

The Author seems to put it out of Doubt, that there is a petrifying Quality both in the Lake and adjacent Earth. What he remarks on the unfrozen Spots in the Lake is curious, and furnisheth a sufficient Answer to those, who would deny any petrifying Virtue to be in the Water, from Experiments not succeeding in some Parts of it; since nothing but Chance could have directed to the proper Places, which, probably, were those unfrozen Parts.

Stones have been thought by some to be organised Vegetables, and to be produced from Seed. To me
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it seems, that Stones are Vegetables unorganised. Other Vegetables are nourished and grow by a Solution of Salt attracted into their Tubes or Vessels. And Stones grow by the Accretion of Salts, which often shoot into angular and regular Figures. This appears in the Formation of Crystals on the *Alps*: And that Stones are formed by the simple Attraction and Accretion of Salts, appears in the Tartar on the Inside of a Claret-Vessel, and especially in the Formation of a Stone in the human Body.

The Air is in many Places impregnated with such Salts. I have seen at *Agrigentum* in *Sicily* the Pillars of Stone in an ancient Temple corroded and consumed by the Air, while the Shells which entered the Composition of the Stone remained intire and untouched.

I have elsewhere observed Marble to be consumed in the same manner; and it is common to see softer Kinds of Stone moulder and dissolve merely by the Air acting as a *Menstruum*. Therefore the Air may be presumed to contain many such Salts, or stony Particles.

Air, acting as a *Menstruum* in the Cavities of the Earth, may become saturated (in like manner as above-ground) with such Salts, as, ascending in Vapours or Exhalations, may petrify Wood, whether lying in the Ground adjacent, or in the Bottom of the Lake. This is confirmed by the Author's own Remark on the Bath called the *Green Pillars* in *Hungary*. The insinuating of such Salts into the Wood seems also confirmed by the Author's having observed minute hexagonal Crystals in the woody Part of the Petrifications of *Lough-Neagh*.

A petrifying Quality or Virtue shews itself in all Parts of this terraqueous Globe, in Water, Earth, and Sand; in *Tartary* for instance, and *Afric*, in the Bodies of most Sorts of Animals, it is even known that a Child hath been petrified in the Mother's Womb. *Osteocolla* grows in the Land, and Coral in the Sea. Grottoes, Springs, Lakes, and Rivers, are in many Parts remarkable for this same Quality. No Man therefore can question the Possibility of such a thing as petrified Wood; tho' perhaps the petrifying Quality might not be originally in the Earth or Water, but in the Vapour or Steam impregnated with saline or stony Particles.

Perhaps the Petrification of Wood may receive some Light from considering Amber, which is dug up in the King of *Prussia's* Dominions.

I have written these hasty Lines in no small Hurry; and send them to you, not from an Opinion, that they contain any thing worth imparting, but merely in Compliance with your and Mr. *Simon's* Request.

[*Added from a Letter to Dr. J. Fothergill, dated Dublin, Aug. 8. 1746.*]

And yet, before I have done, I must needs add another Remark, which may be useful for the better understanding of the Nature of Stone. In the vulgar Definition, it is said to be a Fossil incapable of Fusion. I have nevertheless known Stone to be melted, and when cold to become Stone again. Such is that Stuff, by the Natives called *Sciara*, which runs down in liquid burning Torrents from the Craters of Mount *Ætna*, and which, when

cold and hard, I have seen hewed and employed at *Catania*, and other Places adjacent. It probably contains mineral and metallic Particles; being a ponderous, hard, grey Stone, used for the most part in the Basements and Coinage of Buildings.

Hence it should seem not impossible for Stone to be cast or run into the Shape of Columns*, Vases, Statues, or *Relievo's*; which Experiment may perhaps, some time or other, be attempted by the Curious; who, following where Nature has shewn the Way, may (possibly by the Aid of certain Salts and Minerals) arrive at a Method for melting and running Stone, both to their own Profit, and that of the Public. I am,

Dear Sir,

Your most humble Servant,

G. Cloyne.

* To confirm what the Bishop says, I remember when I was in the College in *France*, that I went to see a Relation of mine, a Frier, at *Fontevrand*, where he shew'd me in their Church two Pillars of Stone, about 60 Feet high, all of one solid Piece, which he said had been run. J. S.