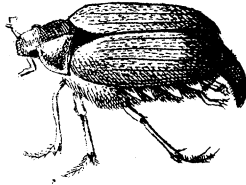


Philosoph. Transact. N^o 234

Fig. i



II. *A Letter from Dr. Thomas Molyneux, Fellow of the Royal Society, to the Right Reverend St. George, Lord Bishop of Clogher; concerning Swarms of Insects, that of late Years have much infested some Parts of the Province of Connought in Ireland.*

My Good Lord,

EVER since your Lordship first spoke to me of the strange Appearance of vast *Swarms* of a sort of *Insects* in this Kingdom; that have lately much infested some Parts of the Province of *Connought*, and the great Ravage and Devastation they have wrought in that Country: I endeavour'd to inform my self the best I could concerning them; partly, I confess, from an Inclination common to those of my *Profession*, to make Inquiries into *Things Natural*; but more especially from an earnest Regard to gratify your Lordship's Expectations and Desires, which I have always look'd upon as Commands, in whatever lies in my Power.

And truly, had not this latter Motive wholly prevail'd upon me, I should have desisted, and given over the further Prosecution of this Search; for I found I undertook it with such Disadvantages, that I could not possibly perform any thing in it, but what must be very lame and imperfect; and so could never satisfy or please my self with it, otherwise than that it was a Testimony of my Respects to your Lordship.

For this *Flying Army*, as I may call them, making their first *Incurfion*, and taking up their *Quarters*, in a Place so remote, above a Hundred Miles from hence, where I never have been; all the Account I can give

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your

your Lordship of *them*, their *Marches*, and the *Destruction* they have brought on the Country ; is only what I have gathered by sending out for *Intelligence*, and depending on the Reports of others ; for what I am able to say of my own Knowledge is but little, and what I observed of this sort of Fly in another Country, and not in this.

Therefore you must not expect their *History*, or an *exact Narrative*, but only such loose Particulars, as I could pick up by discoursing some Gentlemen that live in those Parts where they swarm, little addicted, you may well suppose, to make or communicate *Observations* of this kind: However, I shall not trouble your Lordship with bare *Hearsays* ; the following Account is what I took up upon sure Grounds, and what was generally confirm'd to me, by the Relations of more than one ; and I must here own my self especially obliged, for a great part of my Information, to a Letter, your Lordship did me the Favour to procure, from one of your Acquaintance on this Subject.

The first time great Numbers of these Insects were taken Notice of in this Kingdom, I find was in the Year 1688. They appear'd on the *South-West* Coast of the County of *Galloway*, brought thither by a *South-West* Wind, one of the common, I might almost say *Trade-Winds*, of this Country, it blows so much more from this Quarter in *Ireland*, than all the rest of the *Compass*.

From hence they made their way into the more Inland Parts towards *Heddsford*, a Place belonging to Sir *George St. George, Baronet*, about Twelve Miles *North* from the Town of *Galloway* ; here and in the adjacent Country, Multitudes of them shewed themselves among the Trees and Hedges in the Day time, hanging by the Boughs Thousands together in Clusters, sticking to the Back one of another, as is the manner of Bees when they

they Swarm. In this Posture, or lying still and covert under the Leaves of the Trees, or clinging to the Branches, they continued quiet with little or no Motion during the Heat of the *Sun*, but towards Evening or Sunset, they would all rise, disperse, and fly about, with a strange humming Noise, much like the Beating of Drums at some Distance, and in such vast incredible Numbers, that they darkned the Air for the Space of Two or Three Miles square.

Those that were Travelling on the Roads, or abroad in the Fields, found it very uneasy to make their way through them, they would so beat and knock themselves against their Faces in their Flight, and with such a Force, as to smart the Place where they hit, and leave a slight Marke behind them.

This, though it was no little Trouble, especially to Children, and those that were more Nice and Timorous of the Female Sex; yet it was not the only Inconvenience they brought along with them; for a short while after their coming, they had so entirely eat up and destroy'd all the Leaves of the Trees for some Miles round about, that the whole Country, though it was in the Middle of *Summer*, was left as bare and naked as if it had been in the Depth of *Winter*, making a most unseemly and indeed frightful Appearance; and the Noise they made, whilst they were seizing and devouring this their Prey, was as surprizing; for the Grinding of the Leaves in the Mouths of this vast Multitude all together, made a Sound very much resembling the Sawing of Timber.

Nor were the Trees abroad, and Hedges in the Field the only Sufferers by this *Vermin*, they came also into the Gardens, and destroy'd the Buds, Blossoms, and Leaves of all the Fruit Trees, that they were left perfectly naked; nay, many of them, that were more di-

licate and tenderer than the rest, lost their Sap as well as Leaves, and quite withered away, so as they never recovered it again, particularly several Trees in the curious Plantation of one Mr. *Martin*.

Nay their Multitudes spread so exceedingly, that they disturbed Men even within their Dwellings; for out of the Gardens they got into the Houses; where Numbers of them crawling about, were very irksom, and they would often drop on the Meat as it was dressing in the Kitchen, and frequently fall from the Ceiling of the Rooms into the Dishes as they stood on the Table while they eat, so extremely Offensive and Loathsom were they, as well as Prejudicial and Destructive.

Nor did the Mischievous Effects of this pernicious *Vermin* stop here, their numerous creeping *Spawn* which they had lodg'd under ground next the upper Sod of the Earth, did more harm in that close Retirement, than all the Flying Swarms of their Parents had done abroad: for this young destructive Brood, did not withhold from what was much more Necessary to have been spared, and what their Sires had left untouched: These lying under Ground, fell a devouring the Roots of the *Corn* and *Grass*, and eating them up, ruined both the support of Man and Beast; for these losing their Roots, soon withered and came to nought, to the vast Damage of the Country.

This *Spawn*, when first it gave Sign of Life, appeared like a large *Maggot*, and by taking Food and increasing every Day, became a bigger Worm, till at length it grew as big as a great white *Catterpillar*; from whence, according to the usual Transformation Natural to these smaller Animals, came forth this our Flying Insect; but how or at what certain Periods of Time, these *Metamorphoses* and Changes were wrought, I could not meet with any one able to inform me.

This

This I thought remarkable, that these young and tender Worms should live on a courser Diet, and fare more hardly than their strong and older Parents, whose Food was the fine soft Substance of Leaves and Blossoms, whilst these fed upon the tough and almost Ligneous Fibres of the Roots of Plants. But I find Dr. *Lister* has observed the like difference between the Diet of common *Catterpillars* and their *Butterflies*; those eating the grosser Food of Leaves, whilst these live only on the pure refined Meal, and most spiritous Juice of Flowers: And this seems one of the wise Contrivances of Nature, that adapts as most proper the Airy finer Nourishment, for the more agile and light Body of the *Volatile Insect*, while the same Animal, when a dull *Reptile Worm*, is sustained by a more gross and terrene Food, more fitting to its slow and heavy Nature.

But notwithstanding this Plague of Vermin did thus mightily prevail and infest the Country, yet it would have been still much more violent, had not its Rage been fortunately checkt several ways.

High Winds, Wet and Misty Weather, were extremely disagreeable to the Nature of this Insect; and so prejudicial as to destroy many Millions of them in one Days Time: Whence I gather, that though we have them in these Northern Moist Climates, they are more natural, and more peculiarly belonging to Warm and Dry Countries. Whenever these ill Constitutions of the Air prevailed, their Bodies were so enfeebled, they would let go their holds, and drop to the Ground from the Branches where they stuck, and so little a fall as this, at that time, was of sufficient force quite to disable, and sometimes perfectly kill them. Nay, it was observable, that even when they were most Agile and Vigorous, a slight Blow or Offence would for some time hinder their Motion, if not deprive them of Life, which was
very

very extraordinary in a Creature of that Strength and Vivacity in its Flight.

During these unfavourable Seasons of Weather, the Swine and Poultry of the Country at length grew so cunning, as to watch under the Trees for their falling ; and when they came to the Ground eat them up in abundance, being much pleased with the Food, and thriving well upon the Diet : Nay, I have been assured, that the poorer sort of the *Native Irish* (the Country then labouring under a Scarcity of Provision) had a way of dressing them, and lived upon them as Food ; nor is it strange that what fattened our domestick Poultry and Hogs, should afford agreeable and sufficient Nourishment for the Relief of Man.

In a little time it was found, that Smoak was another thing that was very offensive to these Flies, and by burning Heath, Fern, and such like Weeds, in this or that Corner of their Gardens or Orchards, which lay most convenient for the Wind to disperse it among the Trees, they would secure their Gardens and prevent their Incursions, or if they had already made any Incroachment upon them, by this means they effectually drove them out again.

But towards the latter end of the Summer, the exact time I have not learnt, they constantly eased the Country, and retired of themselves ; and so wholly disappear'd, that in a few Days you should not see one left in all those parts that were so lately pester'd with them.

Where they go is made a Question, some thinking they take their Flight like *Swallows*, and other *Birds of Passage*, as they are call'd, to a more distant Country and warmer Climate. But I believe there is no other Ground for this Fancy, than 'tis observed of this Insect, that sometimes it is *Migratory*, and removes its Quarters from one King-

Kingdom to another ; but this I conceive is but accidental ; and that it commonly quits its former Seat, only for want of Provision, or as we see Bees do, when they find their Hive, or whatever place they fix upon for their Habitation, becomes over stockt and too narrow a Compass for their Reception : as for their removing to so great a Distance, as to Change one Country for another, it happens only I suppose, when some high Wind suddenly rises at the time of their Swarming, and drives them even cross the Seas to seek for a new Dwelling in some other Land.

The true Reason then of their disappearing I take to be, that after their Coition is over, for 'tis about this time they are seen to Couple by fastening to one another by their Tails, they retire under Ground in order to lay their Spawn there, for a succeeding Generation ; and likewise to compose and settle themselves to sleep for the rest of the ensuing Year, as several other Animals are known to do : for Instance, *Snails* among Insects, the *Hedge-hog* among the Beasts, and as I have good reason to think, the *Ortygometra* or *Rail* among the Birds ; a sort of Fowl, that's scarce, if at all met with in some parts of *England*, yet very numerous in all parts of this Country in its Season, but that's but short, and lasts not above Three or Four Months in the *Summer*, during all the remaining parts of the Year, it lies buried and asleep under Ground like these Flies.

What further confirms me in this Opinion concerning these Insects, is, that I am certainly informed by several good Hands, that in the Spring time, by accidental digging or plowing up the Ground, great Hollows or Nests of them are frequently discovered and broken up, where they find whole bushels together in one Heap, but in such a quiet Condition they seem to have but little Life and Motion, for they do not stir unless you touch

or disturb them, and then move but little and feebly, as if they had been asleep and were wakened out of it.

Whether they find out these large Caverns to which they retire, ready made in the Earth, or hollow and form them first for their own Reception, I cannot say, but this I am assured, that they are often met with under a firm solid Surface of Earth, that has not been stirred or plowed in many Years before, and no manifest Passage can be discovered how they got there.

I am informed of another Particular relating to them, and which indeed was very remarkable; That a Year or Two ago in the Summer, all along the *South-West* Coast of the County of *Galloway*, for some Miles together, there were found dead on the Shoar, such infinite Multitudes of this Vermin, and in such vast Heaps, that by a moderate Estimate, one computed there could not be less than Forty or Fifty Horse Loads in all; which plainly discovers to me, how and from whence the first Stock of these came to us, in 1688. For, as I take it, this exceeding great Quantity that lay dead in the Strand, was a new Colony or a supernumerary Swarm from the same Place, driven by the Wind to Sea from their Native Land, which I conclude to be *Normandy* or *Brittany* in *France*, it being a Country much infested with this Insect, and that lies very open and exposed to all these Parts of *Ireland*; and from whence * *England* heretofore

* Of which the Learned *Moufett* in his Book *de Insectis* has left us a remarkable History, p. 160. where speaking of this same Fly, he says; *Proditum est in Anglorum Annalibus, Anno Christi 1574. viceffimo quarto Februarii, tantam eorum Multitudinem in Sabrinam Fluvium de lapsam, ut aquaticis Molendinis Rotas siflerent etque obruerent; & sane nisi unà cum Hominum Industriâ, Gallinâ, Anates, Caprimulgâ, Tinnunculi, Vespertiones, aliaq; Prædatrices Aves, (quæ hos in Primariis habere cibis videntur) auxilio fuissent, suffocata ab his Molendinâ, etiam num hodie obmutuissent.*

has been pester'd in the same manner with Swarms of this Vermin. But these meeting, by good Fortune, with a contrary Wind before they could reach Land, their Progress was stopt, and tired with their Voyage, they were all driven into the Sea, which by the Motion of its Waves and Tide, cast their floating Bodies in Heaps upon the Shore.

This was a most lucky Accident, for had this Second Supply met with as favourable a Gale, and the like Reception with their Predecessors, 'twould have been of vast ill Consequence to us; for how exceedingly must they have increased the Numbers of these we have here already, which alone are sufficient, yearly to trouble and damnify the Country to a great Degree.

Yet some Years are observed not to be near so much infested with them, as others, either on the Account, as I imagine, of the Season proving more prejudicial to them and their *Spawn*; or that they removing their Quarters, leave one part of the Country more free, to settle in another; for they seldom keep above a Year together in a Place, and they compute their usual Stages or March to be about Six Miles in a Year. Hitherto they have directed their Progress from the Place where they first made their Invasion, *Westerly*, following the Course of that Wind which blows most commonly in this Country.

This last Year, 1697. they have reached as far as the *Shanon*, and some of the scatter'd loose Parties cross the River, and got into the Province of *Leinster*, but were met there by a stronger Army of *Jackdaws*, that did much Execution among them, killing and devouring great Numbers. Their main Body still keeps in *Connought*, and took up their last Quarters at a well improv'd English Plantation, not far from the River *Shanon*, called *Earscourt*, where they found plenty of Pro-

vision, and did a great deal of Mischief by stripping the Hedges, Gardens, and Groves of *Beech* quite naked of all their Leaves.

They begin to be apprehensive of them in the *Queens* County; and in order to defend themselves against their Incurfions, are refolved upon their first Approach, to fire the Mountains between them and the *King's* County, that abound much with *Heath*, and by this means raising a Smoke, they hope they may force them to turn their Courfe another way, and fo prevent their making an Inrode into thefe Parts.

Wherever the Country has been infested with this Vermin, by one Consent, though Erroneoufly, they have given them the Name of *Locusts*, being led into this Perfwasion, I fuppose, by thinking that nothing of this kind could have been fo *Numerous*, and done fo much *Mischief*, but *Locusts* only; of which, and the great Destruction wrought by them, they have heard mention fo often made in the Scriptures.

But the true *Locust*, much refembling in Shape a *Common* *Grashopper*, though larger, is quite a different fort of Infe&t from this, which belongs to that Tribe call'd by the Naturalifts *Κολεοπλέγες*, or *Vaginipennis*, the *Scarabeus* or *Beetle* Kind, that has ftrong thick Cafes to defend and cover their tender thin Wings, that lie out of Sight and next the Body.

This *Species* is certainly that particular *Beetle*, call'd by *Aristotle* in his History of Animals *Μελολάγνθυ*, from its devouring the Blossoms of *Apple Trees*, fee *Aldrovandus de Insectis*, Lib. 4. Pag. 448. and is the *Scarabeus Arboreus* of *Moufet* and *Charleton*, call'd by the *English*, *Dorrs* or *Hedge-Chaffers*, and by the *French*, *Les Hannetons*.

They

They are much of the Bigness of the common Black Beetle, but of a Brownish Colour, something near that of *Cinamon*, they are thickly besperr'd with a fine short downy Hair, that shews as if they were powder'd all over with a fine sort of Dust: The Cases of their Wings do not entirely cover all the Back, for their long peick'd Tails, where lie the Organs for Generation) reach a good way beyond them; The Indentures or Joints of each side their Belly, appear much Whiter than the rest: But to avoid being so particular in describing all their Parts, I have hereto annex a true and exact Figure of one of them, borrowed from the *Scarabeorum Tabulæ Mutæ* of Dr. *Lister*, who has neatly express'd it. See the Table, Fig. 1.

And this will give your Lordship at one View, a fuller and truer Idea of them, than the longest and most accurate verbal Description possibly could.

Here some pleasant scoffing Men in the World perhaps might be apt to say, what an extravagant Folly this is, to make so many Words, and keep all this ado, about a poor contemptible Fly. But if these Gentlemen will consider the exceeding great Dammage, that sometimes befalls Mankind, as a Natural Attendant on this insignificant Animal as they would have it, their idle ridiculing Humour might with as much Shew of Reason, droll upon and expose a serious Discourse of the *Plague*. To proceed then :

This pernicious Insect of ours, I am fully convinced, my Lord, from Good Reasons, is, that self same (so often mentioned in *Holy Scripture*, and commonly joined in Company with the *Locust*, as being both great Destroyers of the Fruits of the Earth) to which the *Septuagint* and the *Vulgar Latin Translation*, retaining the Greek Word, give the Name of Βεβρυχος or *Bruchus*, derived from Βεβρυχω, *Frendo vel Strideo*, intimating the

remarkable Noise it makes both in its eating and flying, from whence likewise it has got its *French Name Han-neton*, (as the judicious *Furetiere* in his copious *French Dictionary* tell us) by Corruption from *Aliton*, quasi *alis Tonans*.

I meet with this sort of Fly spoken of in the Bible, *Leviticus* Chap. 11. Ver. 22. *Joel* Chap. 1. Ver. 4. and Chap. 2. Ver. 25. and *Nahum*, Chap. 3. Ver. 16, 17. and it may occur, for ought I know, in several other Places; but I find our *English Version* almost constantly translates this Word $\beta\epsilon\tilde{\sigma}\chi\omicron\varsigma$, though improperly, as I think, *Cancer Worm*, since this denotes only a *Reptile*, or creeping Vermin, whereas that Word imports certainly a *Flying Insect*. For the $\beta\epsilon\tilde{\sigma}\chi\omicron\varsigma$ in Chap. 3. Ver. 16, 17. of the Prophet *Nahum* is expressly said to *Flie*, and have Wings, and its Nature and Properties are most truly and particularly described in these Words: *It spoileth and fleeth away, they camp in the Hedges in the Day, and when the Sun ariseth they flee away, and their Place is not known where they are*: That is, they then retire again to the Hedges and Trees where they lie quiet and concealed, till the Sun sets again.

If this Passage be compared with what I have said above of our Irish $\beta\epsilon\tilde{\sigma}\chi\omicron\varsigma$, we must allow *Nahum* plaid the Natural Philosopher here, in this short, but accurate Description, as well as the Divine Prophet, in denouncing God's Judgments.

In one of the forementioned Texts I find indeed, the Word $\beta\epsilon\tilde{\sigma}\chi\omicron\varsigma$ more rightly translated *Locust* or *Beetle* in our *English Bibles*, and this Place on another Account seems so apposite and agreeable to something I said before, I cannot avoid taking particular Notice of it to your Lordship, and on this Occasion give you my Thoughts more fully concerning the *Rationale* of that odd Clause in the *Jewish Law*, where *Moses* tells the *Israelites*, *Leviti-*

Exod. Chap. 11. Ver. 21, 22. That *These may ye eat, of every flying creeping thing that goeth upon all four, which have Legs above their Feet to leap withal upon the Earth, even these of them ye may eat; the Locust after his kind, and the bald Locust after his kind, and the Beetle after his kind, and the Grasshopper after his kind.*

Now I must confess, notwithstanding all that the learned Commentators have said on this Passage, it hitherto has seem'd to me, (and I believe to most Readers) very strange and unaccountable, that here among the Pure, Wholefom Creatures, proper for humane Nourishment, *Beetles*, and those other Nasty, Dry, and Unpromising Vermin, should be thought fit to be reckon'd up, as *Clean* and proper for the Food of Man.

But since I have had some little Experience of what has happen'd among our selves, upon Swarms of one of these sort of Insects infesting but a small part of our Country, I cannot but admire the Providence of God, and the sagacious Prudence of his Divine Law-giver, *Moses*, who foreseeing the great Dearth and Scarcity that these Vermin might one Day bring upon his People, had a particular regard to it, and therefore gives them here a permissive Precept, or a sort of Hint what they should do, when the *Corn, Grass, Olive-Trees, Fruit-Trees, Vines*, and other Provisions were destroyed by the *Locust* and *Βεῦχοι*, or *Beetles* swarming in the Land: why then for want of other Nourishment, and rather than starve, he tells them, they might eat, and live upon, the filthy Destroyers themselves, and yet be *Clean*: For no one can reasonably imagine, they would ever condescend to make use of such vile, dirty Food, if they could at the same time get any other. So we are to understand that Passage of the *New Testament*, in *St. Matth.* Chap. 3. Ver. 4. and *Mark* Chap. 1. Ver. 6. where 'tis

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recorded of *St. John Baptist*, that he lived upon *Locusts* and Wild Hony, that he did this only in the Desert *Wilderness*, where no other Sufstenance was to be had.

And thus we fee the *Native Irish* were (though unknown to themselves) Authors of a practical Commentary on this part of the *Levitical Law*, and by Matter of Fact have explained what was the true Sense and Meaning of this otherwise so dark and abstruse Text; and indeed such a Caution as this was highly necessary, and of so great Moment to the *Jews*, that it was well worth the Care and Wisdom of their great Leader and Prophet, to insert a *Particular Clause* in their *Law* concerning it: For 'tis certain *Palestine*, *Arabia*, *Ægypt*, and the other neighbouring Countries about *them*, were all extreamly subject to be infested with these sorts of pernicious Vermin; which is the Reason they are so frequently mentioned, and sometimes threatned as Judgments to the *Jews*, by the Prophets in their Sacred Writings.

And this also puts in my Thoughts, that it is more than probable, this same destructive Beetle we are speaking of, was that very kind of *Scarabeus*, the Idolatrous *Ægyptians* of old had in such high Veneration, as to pay Divine Worship to it, and so frequently grave its Image upon their *Agulios* and *Obelisks*, as we see at this Day: though the learned and refining Antiquaries, I know, give a far other Account of this Matter, and tell us a Story of the *Beetle* being an Hieroglifical Representation of the *Sun*, and therefore held as sacred among them; yet this is made out but very lamely, and in my Opinion is a strange and a forced Conjecture.

Whereas nothing can be supposed more Natural, than to imagine a Nation addicted to *Polytheism*, as the *Ægyptians* were, in a Country frequently suffering great Mis-
chief

chief and Scarcity from Swarms of devouring Insects, should from a strong Sense and Fear of Evil to come, (the common Principle of Superstition and Idolatry) give sacred Worship to the visible Authors of these their Sufferings, in hopes to render them more propitious for the Future.

Thus 'tis allowed of all Hands that the same People adored as Gods, the ravenous *Crocodiles* of their River *Nile*; and thus the *Romans*, though more Polite and Civilized in their Idolatry, *Febrem ad minus nocendum venerabantur, eamq; variis Templis extructis colebant*; says *Valerius Maximus, Lib. 2. Cap. 5.* nor were the barbarous *Irish*, though *Christian*, backward to entertain several superstitious Fancies of this Vermin we are discouraging of, some imagining they were the Souls of their deceased Friends, kill'd in the Battle of *Agbrim*, come in this manner by way of Transmigration, to infest their Enemies, the *Heretick English*, because they saw they were the most disturbed, and suffered the greatest Losses by them: But this was only because their Places of abode were most improved, and so afforded them best Reception, and greatest Plenty of Provision for their Entertainment.

Whether these Physico-Theological Notions may be agreeable to your Lordship's Sentiments, I don't know; and therefore I lay them with all Deference before your great Stock of Learning and most discerning Judgment, as a certain *Test* to discover to me, whether there is any thing in them or no: and if I am so happy as to find they are approved by you, though they are out of the common Rode; or should they run counter to what others have said, I shall not fear Censure, or believe my self at all the less in the Right; for I am safe and pleased

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pleas'd while I think as you think, and 'tis my greatest
Ambition to be

YOUR LORDSHIP's

*Most Humble Follower, and
Dutiful Servant in every
Thing,*

Dublin, Oct. 5.
1697.

Thomas Molyneux.

P O S T S C R I P T.

MY LORD,

IT unluckily so fell out, that I could not get the perusal of the industrious *Bochart's* learned Work *De Animalibus Sacrae Scripturae*, (though I earnestly desired it) till I had made an end of this Letter: But since I have procured it; and looking over what he says of this Subject, I find though he differs from me in some things, yet he plainly confirms several Passages in the foregoing Paper, as I could shew by Citations out of him; but the Book being common, and in every Bodies Hands, I chuse rather to refer to it, than trouble your Lordship with adding any thing more, but that I am again.

Your most Faithful,

Humble Servant,

T. M.

III. Part