

The sequel of the Observations hath confirm'd, that the period of 80 days, which was yet somewhat doubtful in the second discovery, is sufficiently just, and that he doth not anticipate 9 revolutions, which are made in 2 years, but by one whole day; & that in the Conjunctions with Saturn his Latitude augments on the one and the other side, according as the ring of Saturn enlargeth it self; though the line of his motion is not parallel to the circumference of the ring: w^{ch} was noted in the first Observations.

The other Planet, which was discover'd about the end of the year 1672, hath his greatest digression from the Center of Saturn only 1 diameter and 2 thirds of his Ring, and the period of his revolution about Saturn is 4 days and a half, but more precisely 4 days, 12 hours, & 27 min. His Latitude augments also according as the Ring enlargeth, and at the present that the largeness of the Ring is greater than the Diameter of the Globe of Saturn, he is to pass in the Conjunctions without touching neither Saturn nor his Ring. Yet notwithstanding we have not yet been able to distinguish him in the Conjunctions either in the upper or lower part of his circle; but only in his greatest, as well Oriental as Occidental, digressions. And this Satellit being alternately one day towards his conjunction, and the other day towards his digression, he is ordinarily not seen but every third day, and rarely 2 days together, when it falls out that at the hour of Observation he is in the middle betwixt the conjunction and digression.

Lastly, the apparent magnitude of these Planets is so little, that posterity will have cause to wonder, that their discovery was begun by a Glass of 17 foot.

And forasmuch as we have endeavour'd with the same attention and care to observe, whether there be not the like Planets about *Venus* and *Mars*, and have not been able to find any, even then when their distance from the Earth was 20 or 30 times less than that of Saturn, it may thence be concluded, that *Venus* and *Mars* have no Satellits, whose surface enlighten'd by the Sun and expos'd to the Earth is not 20 or 30 times less than that of the two Satellits of Saturn, and less capable of reflecting the light of the Sun.

An Account of some Books:

I. *PHARMACOPOEIA Collegii Regalis Lond. A. 1677. in fol.*

THis new Edition, reviewed by the Royal Colledge of the Learned Physitians of London, hath these considerable advantages over the former, that great care hath been taken, not only to correct the many Typographical faults committed in the

former Editions, but also to expunge several prescripts conceived to be now useless, and to substitute in their room a good number of others, found acceptable and useful by experience, both as to the Chymical and Galenical Preparations, tending very much to the fuller instruction of the Apothecaries, & consequently to the great benefit of those that are to be serv'd by them.

II. *Catalogus PLANTARUM ANGLIÆ, & Insularum adjacentium, tum Indigenas, tum in agris passim cultas complectens, &c. Edit. secunda; operâ Johannis Raii, M. A. à Soc. Regia; Lond. impensis J. Martyn Reg. Soc. Typogr. ad insigne Campanæ in Cæmeterio D. Pauli, 1677. in 8°.*

IN this *second* Edition the Accurate and Learned Author hath presented the Curious with a considerable number of Plants not contained in the first; which do amount to about 46; some of which were forgotten in the former Edition, some were newly found out by him. Besides that, here are to be met with not a few useful Observations, which the Author hath partly lighted upon in his reading since, partly received by the communication of his friends. Compare (if you please) what was said of the first Edition of this Catalogue in *N. 63* of these Tracts, publish'd 1670. in *September*.

III. *Aero Chalinos, or, A Register for the Air, &c. By Nathan. Henshaw M. D. Fellow of the R Society, London, 1677. in 12°.*

THIS also is a *second* Edition; which we cannot forbear to give some account of now, considering the ingenuity and usefulness of the discourse therein contained, which was, I know not how, passed over in the first Edition.

The Tract then contains 5 Chapters; the *1st* is of Fermentation; the *2^d*, of Chylification; the *3^d*, of Respiration; the *4th*, of Sanguification; the *5th*, of the Salubrity of frequent changing of Air; together with a discovery of a new Method of doing it, without removing from one place to another, by means of an Air-Chamber fitted to that purpose.

But the main thing, here undertaken by the Learn'd Author, is, that having considered the Air to be of some very general use, and proved great quantity of Air in all mixed bodies, as also that the Air of all simple bodies, is capable of Dilatation or Constriction (or Rarity and Density) by being more or less moved by the presence or absence, the nearness or remoteness of the Sun, he enquireth, Whether all *Fermentation* may not be reduced to this simple motion of the Air, and doth not depend on it, as on a general cause. In the making out of which, if he have

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not failed, he thinks it will be no difficult matter, to reduce all other motions in the world to that of Fermentation, and probably to resolve many hard Questions, not as yet so rightly determined. But because Contemplations of this kind are, in their own nature, very unprofitable, if not reducible to practise; the Author hath endeavour'd to apply the same to the Cure and Prevention of most Diseases.

IV. *A Philosophical Essay of MUSICK*: London, printed for J. Martyn, Printer to the R. Society, at the Bell in St. Paul's Church yard, 1677. in 4^o.

THIS Author's design being to exp'ain the Nature of *Musick*, he begins to inquire into the cause of *Sound*: In order whereunto, he considers some of the chief *phenomena* of *Sound*, as 1. that it may be produced, according to him, in the *Torricellian* vacuity: 2. that it causes motion in Solid bodies, and is diminished by the interposition of solid bodies: 3. that if the bodies interposed are very thick, its passage is wholly obstructed: 4. that it seems to come to the Ear in strait lines when the object is so situated that it cannot come in a strait line to the ear: 5. that when the Air is not in motion, its extent is *spherical*; and when there is a wind, the *sphere* is enlarged on that part, to which the wind blows, and diminished on the contrary part: 6. that it arrives not to the ear in an instant, but considerably slower than light: 7. that it comes as quick against the wind as with it, though not so loud nor so far.

Hence he raises the following Hypothesis. He supposes the Air, we breath in, to be a mixture of different minute bodies which are of different sorts and sizes, though all of them are so small as to escape our senses: the *grosser* of them he makes Elastic, and such as are resisted by solid bodies, altogether impervious to them: The *smaller* parts pass *through* solid bodies, tho not with that ease but that upon a sudden and violent start of them, they shock the parts of solid bodies that stand in their way, and also the *grosser* parts of the Air. Lastly, that there may be another degree of most *subtile Ethereal* parts, with which the interstices of these and all other bodies are repleat, which find freer passage every where, and are capable of no compression, and consequently are the medium and cause of the immediate communication of Sight.

Now, of these three, he esteems the middle sort to be the medium and cause of *Sound*, and that at any time, when the *grosser* Air is driven off any space, and leaves it to be possess'd by these
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and other more subtile bodies, and returns by its elasticity to its former place, then, are these parts extruded with violence as from the center of that place, and communicate their motion as far as the sound is heard. Or, when any solid body is moved with a sudden and violent motion, these parts must be affected thereby: For, as these parts are so much resisted by solid bodies as to shock them; so, on the contrary, they must needs be moved by the sudden starting of solid bodies.

So that (according to him) *Sound* may be caused by the tremble of solid bodies without the presence of *gross Air*; and also by the restitution of *gross Air*, when it hath been divided with any violence. Thus, (saith he) we see, that a Bell will sound in the *Toricellian* space: And, when the Air is divided with any sudden force, as by the end of a Whip having all the motion of the Whip contracted in it, and by a sudden turn throwing off the Air; or by accension, as in Thunder and Guns; or by any impression of force carrying it where other Air cannot so forcibly follow, as upon compressing of Air in a bladder till it breaks, or in a Pot-gun; a sudden crack will be caused.

Having laid down this Hypothesis, and left his Reader to apply it to the afore-mentioned *phenomena*, he proceeds to the Discourse of *Musick* it self, and maketh it a considerable part of his business to shew, How this Action that causes *Sound*, is performed by the several Instruments of *Musick*; having taught his Reader, *first*, What a *Tone* is, and that the Tones useful in *Musick* are those within the *Scale*, in which they are placed as they have relation to one another. *Secondly*, where in consists that Relation of *Tones* & the union of mixt Sounds. Which done, he explains, how *Tones* are produced, and what assistances are given to the *Sound* by *Instruments*. Where he teaches, that wherever a Body stands upon a Spring that vibrates in equal Terms, such a Body, put into motion, will produce a *Tone*, which will be more *grave* or *acute*, according to the velocity of the returns: Wherefore *Strings* vibrating have a *Tone* according to the Bigness or Tension of them; and *Bells* that vibrate by cross Ovals, produce Notes according to the bigness of them, or the thickness of their sides; and so do all other bodies, whose superficies, being displaced by force, results or comes back by a spring which carries it beyond its first station. And here, to make it to be understood, how every pulse upon such vibrations causes *Sound*, our Author gives us to consider, that the *gross Air* is thrown off by the violence of the motion, which continues some moments of time

time after the return of the vibrating Body ; whereupon some space must be left to the subtil matter, which upon the resiliion of the Air starts as from a Center ; which action being the same, by the Author supposed to be the cause of the *Sound*, is repeated upon every vibration.

But finding it more difficult to shew, how *Tones* are made by a *Pipe*, where there are no visible vibrations ; he considers the Frame of a *Pipe*, and the Motion of the Air in it, and thereby attempts to find the Cause of the *Tone* of a *Pipe*, and the pulse that gives the *Sound*: not omitting to explicate, how *Tones* are made in *Violins*, *Harpsecords* and *Dulcimers*.

To this he subjoyns an ingenious Discourse of the *Varying & Breaking* of *Tones*, endeavouring to explain, how it is caused both in *Strings* and *Pipes*: where occur divers pertinent Observations concerning the motion of *Pendulums*, the *Trumpet Marine*, & the *True Trumpet*, as also the *Sackbut*. And having shew'd, that *Sound* doth cause a motion not only of solid bodies, but of the grosser parts of Air within the Sphere of it ; he considers, that if the Air, which is moved by being inclosed, stands upon such a degree of resistance to Compression, that it hath a Spring vibrating in the same measure with the *Sound* that puts it into motion, there will be the same effect, as when 2 *Strings* are tuned in Unison ; that is, the motion will be so augmented by succeeding regular pulses, that the inclosed Air may be brought to ring, and produce a *Tone*. Where he taketh notice of the advice of *Vitruvius* in his *Architecture*, importing, that in the structure of a *Theatre*, there should be vases or hollow pots of several sizes to answer all the *Notes* of *Musick* placed upon the Stage in such manner, that the voice of them which sang upon the Stage might be augmented by the ringing of them : *Vitruvius* mentioning divers antient Theaters, where such were, in some of *Brass*, in some of *Earth*.

After this, he descends to the consideration of the Nature of *Keys* in *Musick*, and of a single *Tune* ; which later, he saith, consists in the succeeding *Notes* having a due relation to the preceding, and carrying their proper emphasis by length, loudness and repetition, with variety that may be agreeable to the hearer.

Next, he treats of *Schismes* and the *Scale* of *Musick* ; shewing that this *Scale* is not set out by any determinate quantities of whole or half *Notes*, though the degrees are commonly so called ; but that the degrees in the *Musical Scale* are fixed by the *Ear* in these places, where the pulses of the *Tones* are coincident, with-

out any regard to the quantity. Here he endeavors to shew, how all the Notes come into the Scale by their Relation and Dignities; whence he thinks it will be obvious, why, for easiness of instruction and convenience, the Scale of Degrees of Musick is made as Musicians now exhibit it.

Having dispatched that work, he proceeds to Musick that consists of several parts in *Consort*, which is made up of *Harmony*, *Formality* and *Conformity*: Of which, *Harmony* is the grateful sound produced by the joyning of several Tones in chord to one another: *Formality* requires, that the succeeding Notes be agreeable to the *former*; and *Conformity* will, that each part have the like tendency to the *succeeding* Notes.

Lastly, he speaks of *Time* or the measures of Musick; the due observance of which is grateful for the same reason given for the Formality of a single *Tune*, because the subsequent strokes are measured by the memory of the former, and if they do comprehend them, or are comprehended by them, it is alike pleasant; the mind cannot chuse but compare one with the other, and observe when the strokes are coincident with the memory of the former. Whence it is, that, the less the intervals are, the more grateful is the measure, because it is easily & exactly represented by the memory; whereas a long space of time that cannot be comprehended in one thought, is not retain'd in the memory in its exact measure, nor can abide the comparison, the time past being always shortned by so much as it is removed from the time present.

The whole is concluded by two Observations, by which we shall likewise conclude this Account: 1. That it plainly appears by the Discourse of this Tract, how Musick comes to be so copious; for, considering the species of keys, the number of them, the variety of Chords, the allowable mixing of Discords, the diversity of measure; it is not to be wondred at, that it should, like Language, afford to every Age, every Nation, nay, every Person, particular stiles and modes. 2. That it appears likewise, that *Tones* or *Modes* of Musick in ancient time could not be of other kinds than are now, since there can be no other in nature. Wherefore the great effects it then had, if truly related, must be imputed to the rarity of it, and the barbarity of the people, who are not transported with any thing after it become common to them.

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Imprimatur,

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