

SOME PARTICULARS OF A SUSSEX HURRICANE IN 1729.

THE following description of a storm of singular severity which occurred in Sussex in 1729 is reprinted from a scarce pamphlet (in the possession of the Editor), which was published by Richard Budgen, London, and "Printed for John Senex, at the *Globe*, over-against *St. Dunstan's Church*, in *Fleet-street*. M.DCC.XXX." The dedication is as follows:—"To the Honourable Sir Hans Sloane Bar^t. the President, and to the Council and Fellows of the Royal-Society, The ensuing Account is most Humbly Submitted by their

"Obedient Humble Servant,
"Richard Budgen."

The pamphlet is dated from :—"Frant near Tunbridge-wells in *Sussex* Octob. 20, 1729."

AN ACCOUNT OF THE PASSAGE OF THE HURRICANE
from the Seaside, at Bexhill in Sussex to Newingden-Level,
May 20th, 1729.

I. A PARTICULAR ACCOUNT OF THE DAMAGE AND DEVASTATIONS OF THE BUILDINGS, TIMBER, &c., THAT STOOD IN THE WAY OF ITS COURSE.

THE first considerable Damage, was received by *Thomas Hollands*, at the lower Side of *Bexhill-Down*, about a Mile from the Sea-side. The East End of the Roof of his House was taken off, with the Chimney almost down to the Chamber-Floor; and the other end of the House uncovered. A Barn that stood at the East End of the House was blown down, and the Timber carried three or four hundred Yards upon the Common; and a Hovel of forty Feet long taken off from the Post, was set upon the Ground, with scarce any of the Thatch broke or disordered.

About a Furlong to the South-west from *Thomas*

Hollands; *John Nash* had some slight Damage in the Covering of his House and Out-buildings: A Haystack near the House was thrown down to the Westward, and a Timber Tree carried to the Eastward, over a Hedge, just by the Haystack, above thirty Rods.

Woodgate, belonging to *Henry Goldsmith*, was left upon the Western Verge of the Hurricane, so that it only slightly touched the Thatch of some of the Out-buildings. In a Valley, upon the same Farm, some Oaks, &c. are blowed down, shattered, and very much damaged. A Birch, whose Boughs were brushed off before, was pretty much singed on the North-west side.

John Philcocks's House, at *Sidley-Green*, (between two Ways) was next in its Passage; which it nearly all uncovered, and drove by the Violence of the Shock, to the North (from an Out-building, joined up to the House, on the South-side) two Inches. A large Barn, within a few Yards of the western Side of the House, was throwed down to the Westward. A ¹Cheesebail and Voler were taken from a Shelf in a Chamber, and a Duck's Wing that lay upon the same Shelf was left: The Voler was found some Days after above a Furlong from the House, over a rough high Hedge and woody Pit; but the Cheesebail has not been heard of since.

Cross the way, and about twenty Rods more to the Eastward, *William Gybson* had two Rafters taken off from the South-west Corner of his House.

Engrim Wood, belonging to *George Naylor Esq*; lies about two Furlongs to the North of *Sidley-Green*; in which the Width of the Hurricane was considerably increased: For, from the Sea-side to *Sidley-Green*, it scarce any where exceeds thirty Rods; but here 'tis about sixty in Width, and seventy Rods cross the Wood, in the way of the Hurricane; wherein, about one hundred and fifty Oaks are torn up with the Roots, broke down, and shook to pieces, or very much damaged. (The Reason of the Trees falling in all kind of Directions, will readily be

¹ A Cheesebail is the Hoop that encompasses and gives Form to the Cheese in the Press; and the Voler is a round Piece of Inch Board, fitted into the Bail, that communicates the Force of the Press upon the Cheese.

understood by a View of the Spiral Line in the Plan.) The Coal wood, belonging to the said Mr. *Naylor*, was next in its way, but being almost ready to fall, 'tis very difficult to give any tolerable Estimate of the Damage in the *Underwood*, or Timber: But the Storm passing over the Wood, near a hundred Rods in length; it cannot be supposed very inconsiderable. Adjoining this Wood, on the North, one Side of a Hovel, in a Fattening-Pound, is taken off, and the other left standing. In the *Heniker-Wood*, but one Field further, in the space of about twenty-five Rods wide, and the same Space, in the Way of the Hurricane; about fifty Oaks were torn up by the Roots, broke down, and shattered in pieces. The Farm-house, *Buckhold*, was the next considerable Obstacle in the Way, where a Stack of Chimneys on the West Side of the House was turned down upon the House, with a Direction to the East, and took off most part of the Ridging of the House. A large Barn, on the East Side the House was blown down, and some of the Timber and Tiles carried over a standing Wood, above a quarter of a Mile. A Hovel, Malt-house, and another Barn, very much damaged in the Covering. A Hog-pound and Sty, covered with a Roof, and thatched, in a very unaccountable manner had all the middle Part taken away from Top to Bottom, and only the two Gable-Heads remained standing, with the Thatch intire. In another Wood, about a Furlong over, near the House, it demolished a considerable Number of Timber-Trees, in the same manner as before, where it left Mr. *Naylor's* Estate; and, after brushing the Boughs from most of the Oaks in the Hedges, in passing over about a hundred Rods of plain Land, belonging to Mr. *Ralph Norton*, it took off one Stack of Chimneys, and the upper Floor of one End of the House, and untiled nearly all the rest: A large Barn, a Coach-house of Stone Walls, two Foot thick: A large (but appeared to have been a crazy) old Building of Offices, belonging to the House, and all the Trees in a pretty large Orchard, except two or three, were blown down.

Descending about a Furlong below Mr. *Norton's* House, it swept down the Timber in a small Coppice;

passed over a Rivulet, and drove up a Gill² into the *Forwood*, a large quantity of Woodlands near a Mile over in its way, belonging to *Thomas Pelham* Esq; of *Lewes*; but the Underwoods being advanced to such a considerable Height, and so large a quantity lying in the way of its Course, I dare not venture to give an Estimate of the Number of Timber-Trees that now bear the Badge and Marks of its Fury. Adjoining the *Forwood*, on the North Side, it run through some Woodlands belonging to *Forster* of *Telham*; but left his House upon the Western Verge of its Course.

After shattering a *Gill* of fine young Timber near *Loose*, it turned down a Chimney at the West End of the House which belongs to Sir *Thomas Webster* Bar. and pretty much damaged the Tileing: Blowed down a Barn near the House, and a Malt-house, besides most of the Apple-Trees were taken out of the Ground and scattered about the Orchard; two were carried together in one Hedge, and a pretty large one carried over one Hedge and into the next. In a Closet the West side of the House, lay some Butcher's Wooden Skewers, that were carried from the Closet cross a large Parlour, and stuck fast in a Piece of Oak Timber in the Parlour Wall. In the same Closet, a Pot was placed in a pair of Scales that hung against a Wall the other side of the Room, in the same Position it stood before. Here, and likewise at most of the other Houses that had the misfortune to lie in the way of the Tempest, they had all their Doors and Windows thrown open in a Moment; and the very Instant, particularly here, the Brewhouse Door opened into the Kitchen with a Discharge of Fire, and Ashes, from the Kiln; which were soon joined by the Fire and Ashes in the Kitchen; these together with the Dirt, Dust, Stones, Boughs, and Leaves from without, formed and dispersed a horrid Mixture all over the House in a Moment. About two Furlongs from *Loose*, it crossed the Road from *Battel* to *Hasting*, unpoled a Hop-garden cross the Way, and took off the Hop-garden Gate, and carried it away; the Head was afterwards found at one Place and the Slits at another, above a quarter of a Mile

² A Gill is a small Rivulet, with a sharp Ascent on both Sides.

from the Place where taken off. To this Hop-garden joins the *Bothurst* Woods, very full of Timber, likewise belonging to Sir *Thomas Webster*: Where it tore up by the Roots, twisted asunder and broke down most of the Timber, by the Course of a Gill in its Way, for about a hundred Rods wide; and demolished a very large strong Barn at *Marlly*, near the Western Verge of its Course, as appears by the Farm-house &c. standing intire not above fifty Yards more to the Westward. After it had slaughtered down the Timber in the *Bothurst* Woods, near a Mile in Length, and at some places half a Mile in Breadth; it forced a Glade through the *Petly* Woods, likewise very thick set with Timber: which is either torn up by the Roots, twisted and shook in pieces, or the Tops cropt off and demolished. The whole Quantity of Timber-Trees blowed up by the Roots, and broke down, upon Sir *Thomas Webster's* *Battel* Estate is computed at least to thirteen or fourteen hundred Trees. From these Woods it crossed the Brooks, and no more Woodlands nor Buildings lying in the way till it reaches *Sedlescomb-Street*; what appears is only the Hedges disordered and drove out of their Places, Stems turned up by the Roots, and the Earth of some sowed Land, drove into the Hedges with such Violence and Quantities, as intirely to cover the Wood and Leaves of the Hedges.

Richard Elliot, the South Side of *Sedlescomb-Street*, had two Barns down; one of them was just raised new and only thatched: His House somewhat damaged in the Tileing; down lower in the Street the Thatch is a little touched at some Places, but the Damage is inconsiderable.

The next House to the Westward belongs to *John Reed*, who had the Corner of an Out-building down, and his House pretty much uncovered.

William Wallis's House stood in a Piece of Ground inclosed by the Highway; the Occasion of his House's falling, seems partly owing to a large Apple-Tree brought out of a Neighbour's Orchard, over three Hedges, with the Roots and Earth about them, that fell upon his House: He had the Misfortune to have his Thigh broke in the Fall. Over-against *Wallis's* House, *Mrs. Tomlin* had a House and Barn blowed down.

Over against the Church, *Samuel Plummer* Gent. had the Roof of a large Outbuilding taken off; some Rafters out of his Barn, and his House pretty much damaged in the Tiling.

The Parsonage House had the Ridge and Corners uncovered, and a Barn by the Way-Side blowed down.

The House by *Castleman's* Oak, belonging to Mrs. *Tomlin* aforesaid, had a Stack of Chimneys turned down upon the House; which in their Fall broke two or three Rafters.

From *Sedlescomb*-Street it bore up a small Valley between two Woods, (pretty much damaging the Timber of the said Mrs. *Tomlin*, on the Western Side of its Passage, and some Woodlands belonging to *William Bishop* Esq; on the East) to *Great Saunders*, the Seat of the said Mr. *Bishop*; where out of five it beat down three Stacks of Chimneys: A Barn and Lodge by the House, and a Malt-house very much shook and damaged in the Covering. And above two hundred Yards in Length of Brick-wall, of which some was little more than three Feet high, and appeared by the Situation as well as Height to have been secure from the utmost Violence of the Wind.

Mrs. *Tomlin* had another House and Barn blowed down about two Furlongs East by South of *Great Saunders*; the Woman her Tenant, with the Fright and some Hurt received by the Fall of the House, is dangerously ill.

About three Furlongs from *Great Saunders*, in a Gill it passed through more Woodlands of the said Mr. *Bishop's*, very full of fine Timber; where it raged with great Violence, sparing scarce any thing in its way: And about a Furlong down the Gill, at *Horsford* belonging to *Henry Bishop* Esq; demolished one Barn and Lodge, and took off the Corner of another Barn, from thence ascending through Woodlands of the said Mr. *Henry Bishop*, where it not only tore the Trees up by the Roots, but took the Earth that was rent up in prodigious Fitches, with such Violence, that it covered the Bodies, Boughs, and Leaves of the Trees. And in the next Field, blowed up a Barn, and scattered the Timber to the North and West, at three or fourscore Rods distance.

The next Building in its way, belong'd to *Thomas Holman*, who had the Roofs of his House and Barn, taken off, and the Chimney down to the middle. A Man in Bed slept out the Storm, and knew not the Conveniency he had for Star-gazing, till awaken'd by the rest of the Family.

From hence it passed through some Woodlands belonging to Sir *Thomas Webster*; but there being but little Timber in its Way, the Damage was not very considerable.

About a Mile from *Staple-Cross*, in the Road to *Northyham*, Mr. *John Collier* had a Barn blowed down, and the Ridging of the House unheeled. The next House toward *Staple-Cross*, belonging to *William Reed*, was pretty much damaged in the Tileing.

At *Collier's Green*, a House belonging to Mr. *Richard Boys*, had the Chimney took off in the middle, all the Windows broke, and some of the Rafters, and the House uncovered. Near the House a Barn was blowed down, in which stood a Waggon that was turned bottom upwards; and two Dung-Carts were carried away in the Storm, of which they can only find some broken pieces about in the Fields. His Tenant, just as the Windows were drove in by a violent Impulse, was pushed against his Wife, and beat her down in the Chamber; a Child that sat in a Chair at the Feet of the Bed, was carried in his Chair and set in the Fire-Place: And the Gravel Stones, from the High-Way, and Glass from the Windows, were brought in with such Violence as to stick in the Chairs, &c. like Shot discharged from a Fowling-piece.

About ten Rods further Mr. *Magick's* House has two Chimneys off, and a Barn down. Twenty Rods back to the North *Mart. Russel* has a House slightly damaged in the Tileing. To the West of hers fifteen Rods, Mr. *Magick* has another House, which has lost some of its Covering.

From *Collier's-Green*, it hurried through Woodlands belonging to the Earl of *Thanet*, and *John Lade* Esq; turned up a Barn, and carried a very large strong Chimney clean over an Outlet, that joined up to the West

Side of *Castleden* Farmhouse, belonging to Mr. *John Blackman*; and spoiled a pretty deal of good Timber in the Hedge-rows of his Farm. From thence it broke furiously into more Woodlands of Mr. *Lade's*, belonging to his *Sempstead* Farm; where he had a Barn and Lodge rent down, the Windows of the House shattered in pieces and the Covering of the House very much ruffled and disordered. Mr. *Lade* has about four hundred Trees damaged; of which, Account is taken of one hundred and thirty-six that are torn up by the Roots and shatter'd in pieces. About half a Mile further at the Entrance of *Newingden-Level*, the Violence of the Hurricane began to abate, insomuch that at the Ascent of the Uplands, on the North Side of the Level, there is scarce any Appearance of its Way, till about three Miles further at *Rolvenden* Church, it slightly touched some thatched Buildings.

About two Miles further in the East Part of *Benenden* Parish, it had pretty well recovered its former Violence, driving down most of the Barns, Timber-Trees, &c. in the Way of its Course, and continued through the Parish of *Bidenden* and some Part of *Smarden*, where entering a large Vale (at crossing the Eastern Branch of the *Medway*) under the Ridge of *Kentish* Hills, the Force visibly abated; and if the Matter was not exhausted, yet so far diminished or chilled, as to leave no Appearance of its Passage through the other Part of *Kent*.

II. AN ACCOUNT OF THE WEATHER, AND BEARINGS OF THE WINDS THAT PRECEDED THE HURRICANE; WITH THE CELERITY OF ITS CIRCULAR AND PROGRESSIVE MOTION, THE TIME TAKEN UP, AND DISTANCE IT PASSED ALONG, OVER THE EAST END OF SUSSEX.

THE Design and View in tracing the Way of this Hurricane was not so much to satisfy those whose Principle of Curiosity is affected, and moved only as the Matters related are more or less surprizing and uncommon; but chiefly to collect such certain Facts, as had the Appearance of being most useful and assisting, to lead a Philosophical Inquirer toward the Causes. To which End, I

shall further add an Account of the Weather, and Bearings of the Winds before the Hurricane; and some Observations and Remarks, as to what immediately relates to the Action, of what has been above particularly described. And then by way of Enquiry, some Thoughts that occurred in describing the Passage of this Hurricane, just as they offered: for other Business at present, would not give me leave to pursue the Thoughts, so far as to be satisfied in my own Opinion by Reasoning, neither does it appear to me that any just Conclusion from Reasoning can be produced; without being furnished not only with a long Series of Observations, but a good Collection of such kind of Experiments, as have not yet been tried, or at least never published.

To a Philosophical Genius however, it cannot be unacceptable to be informed of the Weather that preceded the Hurricane; especially in relation to the Bearings of the Winds, which in Inquiries of this kind seem to be most essential, and immediately concerned in producing these Phænomena.

When it is considered, that the 11th of *May* produced a Storm of Hail toward Night, the Wind West by North; and that for the most part, the Wind had hung upon the Northern Points for a long time before: it will scarce be thought necessary to consider, either the Quality of the Weather, or Bearing of the Winds before that time. The 12th, appeared a white Frost in the Morning, but proved a warm fair Day after it, with a moderate Breeze, South by West. The 13th was pretty clear, with a calm Breeze from the South. The 14th, somewhat cloudy, with a gentle Wind from the West. The 15th was very clear, with a warm Breeze from the South-East. The 16th, a very serene Air, with a sensible Increase of Heat; Wind South-East. The 17th very clear with a soft West Wind. The 18th very serene, and began to be exceeding Hot and Sultry; Wind South. The 19th, a somewhat thick Air in the Morning, but very clear and exceeding Hot in the Afternoon; Wind South-west by South. The 20th, a slight flying Tempest in the Morning, with a little scattering Rain; the rest of the Day very clear, and extreme Hot and Sultry; Wind South till about five in the

Afternoon, when there began to appear a Haziness in the South, which, by degrees, with a vanishing Edge, arrived at our Zenith about seven; when there began to appear plain Symptoms of a Tempest. We distinctly heard the Thunder at Eight, and had a Prospect of two different Tempests; one come over by *Newhaven, Lewes, and Crowborrow*, and scattered part of the Shower upon us at *Fraint, and Tunbridge-Wells*; the other from *Cuckmare-Haven, by Aldfriston, between Mayfield and Burwash, to Wadhurst, &c.* About nine, these Storms were passed over us into the North, and made an Opening in the South-East, where we had the surprising Horror of seeing (at about twenty Miles distance) such unintermitting Coruscations, together with such dreadful darting and breaking forth of liquid Fire, at every Flash of Lightning, (in the way of the Hurricane from the Seaside into *Kent*) as perhaps has not been seen in this Climate for many Ages.

A careful Collation of the Weather of the nine Days preceding this Hurricane, must weaken the Opinion of those who believe Spouts and Hurricanes have their Original, or any ways proceed from a Flatus, or any kind of Perspiration from the Bowels of the Earth. If they consider that the 12th and 13th, we had a slow soft Breeze from the South, which cannot be supposed to reach far North beyond us, because the cold Northerly Winds we had for a long time before, must have brought the Northern Air to such a degree of Density, as would not easily give way to a more rarified Air from the South; and that the 14th we had a westerly Wind, which was repulsed and brought back by a South-East Wind upon the 15th and 16th; the 17th, we had again a warm Breeze from the West: And, that upon the 18th, 19th, and 20th, we had a South, a South-West by South, and a South Wind; which alternate Drivings of the Winds, as it were to one Point, must naturally be conceived, to have heaped together such a Quantity of Materials, as would be abundantly sufficient to produce a Hurricane somewhere in our Neighbourhood.

If to speak freely, (without being too much fatigued with the Care of avoiding all Objections, in a Matter of

so much Nicety might be excused) I should suppose the South Wind of the 12th and 13th scarce arrived to *Yorkshire*, before it would be brought to an Equilibrium, by the Density of the colder Northern Air; and that the West Wind of the 14th, by the Velocity with us, could not get beyond *Antwerp*, before the Course would be altered, by the South-East Wind of the 15th and 16th: Here it may be proper to observe, that a South-East Wind upon the eastern Coast of *Sussex*, is by the Ridges of Hills, generally running from East to West, commonly deflected into a direct Easterly Wind, in the western Countries, as a South by West Wind, in the Counties adjoining *Wales*, is with us for the most part a South-west Wind, as I have found, by comparing my Journal of Weather, observed in *Shropshire*, and the South part of *Cheshire*, with that observed by a Friend here, in the East Part of *Sussex*: so that in these two Days, it hardly reach'd the Coast of *Ireland*, before it would be opposed by the westerly Wind of the 17th. The 18th, 19th, and 20th, the Wind was South, or near the South Points. From hence, the Northern cold dense Air is considered as a Barrier in that Quarter, and the alternate driving of the East and West Winds to one Place, will naturally be conceived to have heaped and crouded together a vast Quantity of Vapours, and Exhalations of various Qualities; and in order to restore an Equilibrium in the Atmosphere, the Thinness and Rarity of the Air to the Southward, would by a North Wind, have given way for a Discharge of this Collection of Vapours into that Quarter: But instead of that, we had a direct South Wind, immediately succeeded the West, for three Days together; which not only kept together the former Collection of Vapours, in order to discharge them, either by a Spout or Hurricane, but brought and heaped on a vast Quantity of more calent Sulphureous Vapours from hotter Climates; which consequently, according to Phænomena, seems almost necessary to be discharged in a Hurricane. I could not help being a little surprized, when I examined in my Journal, the Weather that preceded the Hurricane, to find how natural and regularly

the Bearings of the Winds with us, conspired to produce it; and doubt not but if a proper Genius more at leisure, were carefully to consider what Influence the Sun, and Moon, the Monsoons, Trade, and periodical Winds, the Bays, Promontories, Mountains, &c. might have upon the irregular and uncertain Course of our Winds at that time; a more primary and satisfactory Account might be given, not only of this Phenomena, but in some degree enable us to judge of the Cause and Reasons of the Wind shifting and changing so irregularly in our Climate for the future.

The Inhabitants that live by the Sea-side, at *Beahill*, where this Hurricane landed, give but a very imperfect Account of the Appearance of the Clouds at that time; which might be owing partly to several Tempests about, almost covering the Face of the Heavens, and in some measure to the approaching Duskiness of the Evening, and the Dread and Terror of facing such prodigious Flashes of Lightning; nor could I hear of any Seafaring Men that happened to be off at Sea any where near that Evening. At *Battel*, it was observed as, and compared to a prodigious Smoak rolling from a Lime-kiln. At *Erhurst*, a Brightness was observed in the Clouds, approaching about the Breadth that afterwards appeared to have been taken in by the Hurricane, and such a strong Light during the time of the greatest Violence of the Storm, as far exceeded any of the preceding Flashes of Lightning.

By the best Account I could collect, it came ashore about nine a-clock in the Evening, or somewhat before, and entered *Newingden-Level* at twenty Minutes after. The whole Duration of this Hurricane at every particular place it passed over, was computed at three Minutes; but of that violent Part which did the Damage to the Buildings and Timber, all agreed did not exceed a Minute; some affirmed half a Minute to be the full time it lasted.

The Distance from the Sea-side to *Newingden-Level*, is about twelve Miles, which it passed over in twenty Minutes; and if we take seventy Rods for the mean

Diameter of the vertiginous Motion, the Duration of the offensive Wind could not exceed twenty Seconds; which, if it be considered, how little for the most part the Duration of a Minute is understood by the Persons from whom we are obliged to collect this Account, and the unspeakable Horror and Surprize they were in while their Houses were shook and torn in pieces over their Heads; perhaps few People in such Circumstances would guess twenty Seconds, much less than half, if not a whole Minute. According to this Computation, the direct Velocity of the Storm is forty-two Feet in a Second; to which, adding forty-three Feet for the Increase by the Vertiginous or Spiral Motion, makes eighty-five Feet; which is the space run through in every Second of Time near the outward Verge of the Gyration, and the Velocity by which all Obstacles received the Impulse of the Wind.

III. SOME OBSERVATIONS ON THE WAY AND MANNER OF ITS COURSE.

The Way of the Tempest, was nearly from South by West, to North by East in a direct Line; for all Variations appeared visibly to be owing and guided by the Situation of the Surface of the Earth, always inclining and deflected more or less to the East or West, in pursuit of the lower Ground.

By passing through and between Buildings touching both Sides, and by the circular Lanes, at some Places in Woodlands that were full of Timber, and by some particular Buildings rent in divers Parts, by Impulses of several Directions, undeniably proves that the swift vertiginous Motion of Hurricanes is not owing to any Force equably impressed upon the Fluid in Motion, according to, and as they are commonly compared to liquid Whirlpools, as Waters running into a Funnel, &c. but rather, that the offensive Part of the Fluid that moves with such Violence, as scarce to be resisted, appears to have taken in, not more than one twentieth or twenty-fifth Part of the Diameter of the Whirlwind or Fluid in a vertiginous Motion; for where it raged with the greatest Violence in Thickets of Tim-

ber, some Trees had not the least Appearance of a Storm by Twigs or Leaves blown off, yet all the Trees about them were torn up by the Roots, and shattered into Splinters; and in Buildings, two or three Rafters commonly taken from a House or Barn, and even the Thatch, or Healing of the other Parts of the Buildings, no ways ruffled or disordered.

That its Motion was *contra Solem*, or from the right Hand to the left, was plain from all Bodies (unless its Course was deflected by the Situation of other Obstacles) being drove down near the Eastern Verge, towards the North; and near the Western, towards the South.

It generally raged with the greatest Violence in Gills, that had a considerable Declivity on both Sides, and upon the highest Ground it passed over.

By increasing in Breadth, as it ascended to the Tops of the Hills, gives reason to believe the Body of the Hurricane was like a Truncate-Cone inverted; which, perhaps when this Knowledge is raised to a higher Pitch, and these Appearances better understood, may be found a necessary Form, not only for Hurricanes, but all kinds of Spouts and Whirlwinds.

From the Hurricane's carrying and driving large Oaken-Tops, with the greatest Part of their Bodies twisted asunder near the Roots, over Fields and Hedges, (some places grazing upon the Ground, then mounted up again over Hedges, &c.) is demonstrated, that the circular Motion before observed (by some kind of Resilition or Reflections, by the return of an oblique Impulse from the Surface of the Earth) rebounded in a vertiginous Motion with great Violence.

IV. BY WAY OF INQUIRY, SOME ACCOUNT ATTEMPTED OF THE CAUSES OF TEMPESTS, WHIRLWINDS, AND HURRICANES.

Whether that part observed in the Hurricane to drive but a small Breadth, and to move almost with an irresistible Force, is not peculiar to Tornado's and Hurricanes, having an immediate dependance upon the Lightning; and whether the very sudden Rarefaction of the

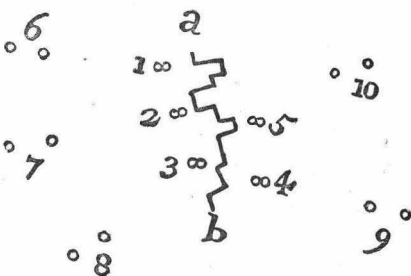
Air by the Lightning, do not very much accelerate the Motion of Whirlwinds, by the quick return of the circumjacent Air from all Sides, to restore the Equilibrium, and by running precipitantly together with the greater Fury, because the outward Verges being environed by the exquisitely swift Motion of the Wind, will not easily be broke through, nor the descending incumbent Vapours crouded together, be easily supported, but by causing a violent Vibration, immediately burst out in another Coruscation; which Collision and rushing together may more naturally be conceived by the return of Water in a Whirlpool, or even stagnate Water after divided by a quick Stroke with a Rod, or one's Hand, than can be described by Words; and consequently, whether 'tis possible to account for such incessant Flashes of Lightning to be of so long Duration, in any other Circumstances than a Hurricane; and whether the Force that proceeds from the Explosion, is not immediately deflected, and carried by the Whirlwind into a circular progressive Motion, with a decreasing Velocity, till re-inforced by another Explosion, driving a Breadth, not more than one twentieth or thirtieth Part of the Diameter of the Hurricane.

Whether a calm and serene Air, to give time for the Vapours and Exhalations to rise to the greater Height, and then the alternate driving of contrary Winds is not necessary to produce a Hurricane; and, whether such a prodigious Concourse of Vapours do not, at the place where they happen to be at the greatest Height, overballance the Airy Fluid, and begin to descend; and being deflected ever so little by the least Clashing of two different Impulses of Wind from the Motion they were first in, will not immediately, and from thenceforth incline more and more toward the Center of the Curve it moves in, and commence a spiral or vertiginous Motion; and so continues with an accelerated Velocity, according to its Height, till coming near the Surface of the Earth, (where the Region of Thunder and Lightning is always observed) there meeting with Exhalations of Nitrous, Sulphureous and vitriolick Qualities; and by the exceeding Violence and Attrition of this kind of Motion,

whether the Vapours are not soon turned into a Flash of Lightning, by which the Air being very much rarified and thrust tumultuously every way from the Explosion, but by the Nature of its Gravity, and strongly urged by its unbounded Elasticity, rushes back as violently to restore an Equilibrium, by which fresh Vapours in abundance are crowded together; and by the exceeding Violence of their Collision, another Explosion immediately follows, and so continues flashing quicker or slower, and the Tempest and Hurricane of longer or shorter Duration, according to the Quantity and Quality of the Vapours and Exhalations that lie in the way of its Course.

Whether the Reason, why the Flash of Lightning does not run like a Train of Gunpowder through all the Exhalations that are a fit Pabulum for the Continuation of a Tempest, may not readily be conceiv'd by considering, that even Gunpowder, by which Fire is communicated much quicker than by any other Substance known to us, yet any considerable Quantity fired in the open Air, or even in Guns, if not compressed by ramming, &c. will by the Celerity of its Motion, out-run the Fire, and be scattered about in whole Grains. But if this should not give a distinct and satisfactory Idea, whether the Figure in the Margin representing the Situation of the Vapours before the Explosion, and after, may not appear much more to the Purpose; for

if *a b* is the place where the Fire begins the Vapours at a small Distance, 1, 2, 3, 4, 5, by the sudden Dilatation and Rarefaction of the Air will immediately be thrust to 6, 7, 8, 9, and 10, by which it evidently appears that such Vapours as were in contact at 1, 2, 3, 4, and 5, will at 6, 7, 8, 9, and 10, be removed to a considerable Distance, even beyond the possibility of taking Fire one from another.



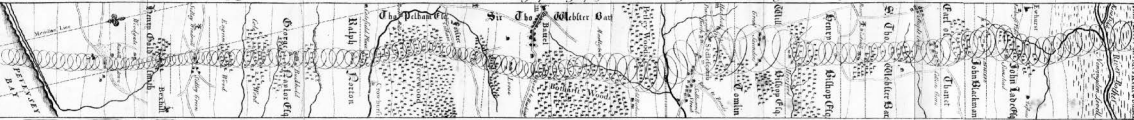
Whether the Fog of Watry Steam in *Newingden-Level*

being caught up, dispersed, and mixt with such Vapours and Exhalations as nourished and fed the Tempest, might not so far moisten and chill the Sulphureous Vapours, as to prevent their taking fire; and consequently so far abate the Force of the Hurricane, as to pass five or six Miles before it recovered its former Violence: And whether it might not be from the same Cause, and a decrease of the Fiery Pabulum, that its Force was so far diminished, in passing over a large Vale, under the Ridge of *Kentish*-Hills, as to leave no Appearance of its Course, in going over the Hills and other Parts of *Kent*.

NOTE.—In the original pamphlet Mr. Budgen appends to this description an account of several mechanical contrivances for raising water to any required height, &c., but these dissertations—although quaint in their way—having no local interest, I did not consider it necessary to reproduce.—ED.

An exact Plan Describing the Passage of the TORNADO, or HURRICAN, From the Seaside in Sussex, to Newingden Levell.

The 20th Day of May 1729. between Nine & Ten in the Evening, by Rich^d Budge.



NB: The Distance between the Irregular and the Plain Line, shows the Perpendicular height above the Full at Sea, Or rather the Profile of the Surface of the Earth pass'd over by the Hurricane, as the small Dotted lines show the Surface in a direct view of the course of the Tempest. By the Spiral line, appears the space taken up or Breadth, & with what Direction all Objects received the Impulse of the Hurricane, & likewise that the Direction was from East to West. Dotted lines show the divisions of the Country pass'd over by the Hurricane.

