

On Winds

Theophrastus



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FROM what elements, in what manner, and through what causes the physical constitution of the winds derives its origin has been already considered. We must now endeavour to show that each wind is accompanied by forces and other conditions in due and fixed relation to itself; and that such conditions in fact differentiate the winds one from another.

Now, the differences that exist involve, and consist of, such conditions as the following: — for instance, greater or less volume, cold, heat, or (in more general terms) storm or calm, wet weather or clear weather; and, again, their frequency or infrequency; their occurrence season by season, or not at all seasons; and whether they are continuous and uniform, or intermittent and variable. In a word, they involve every condition that arises in the heavens, the air, the earth, and the sea by reason of the blowing of the wind. Our enquiries in fact follow the same lines and concern the same matters as do the studies of animals and plants.

Now, as each wind has its own particular place of origin, and this is, as it were, of its essence, it is from this that the distinctive features and peculiar forces of each generally arise; such as, in the first place, the greater or less volume; higher or lower temperature; greater or less amount, and [secondly] the majority of other physical conditions.

Winds from opposite quarters have, at the same time, both identical and opposite characteristics; and there is no inconsistency in this. Take, for instance, the N. wind and the S. wind. They both are strong winds, and blow longer than any others; and this is because the greatest amount of air is compressed towards the North, and towards the South; those parts being to the right and the left of the path of the sun, from its rising to its setting; for here the air is expelled by the power of the sun; and so the air [there] has the greatest density, and the greatest amount of cloud. A great quantity of air being thus collected at each point, a greater and more continuous flow of air thence occurs with greater frequency; and from these causes, these winds derive volume, continuance and duration, and other such conditions.

But the coldness of the one, and the heat of the other, appear to be most clearly due to the place of origin of the particular wind; for the Northern parts of the world are cold; the Southern parts warm; and the air that flows from either quarter has the corresponding character. Now, the less open the surrounding district is, so in proportion is the current less diffuse; while that which is borne through a narrow space and with more violence is colder; but that which is poured abroad into the wider space beyond becomes more moderate in its rate of motion. For which reason also the S. wind is colder there than it is with us; and even, as some say, colder than the N. wind.

But the change [in its temperature] makes itself more appreciable as the place is warm to begin with.

Indeed this [variability] is common practically to all winds. Whether the wind from either [of two opposite quarters] produces wet or clear weather, whether it is squally or steady, recurrent or continuous, uneven or even, or again its intensity in one case at its commencement, in another as it ceases, are matters which are more directly referable to the distance apart of the places [of origin and of observation]. For wherever any particular wind blows from, there it is accompanied by clear weather; but to whatever place it impels the air there it is accompanied by clouds and rain. This is the reason why the N. wind, and even more so the monsoon, brings rain to those who live towards the South and the sunrising; while the S. wind, and generally speaking all winds which blow from that quarter, bring rain to those who live towards the North.

And, in this connection, it is not of slight, but of the greatest, importance that the places [where such effects are observed] should have a sufficient elevation. Wherever the clouds strike and take up a position, there also is a source of rainfall. For which reason, of several places close together, some are wet in the presence of some winds; others in the presence of others; rain however has been elsewhere spoken of at greater length.

It is from the same cause that the N. wind is strong immediately it begins to blow; while the S. wind is strong as it is leaving off; on which facts is founded the proverbial advice about sailing. For the former immediately as it were attacks those who dwell in the North; but the latter stands far aloof; but when volume has been gathered, then comes the rush from afar, although after a longer delay. And so conversely in Egypt and places thereabouts the S. wind is

strong at the beginning; whence there they reverse the proverb.

In like manner, with them, the S. wind particularly exhibits the characteristics of recurrence, steadiness, continuousness and regularity, for such is always the character of each wind among those who are near its place [of origin]; but when it reaches those who are afar, it is irregular and disorganised.

The causes which have been mentioned must be understood to be the causes of these latter facts as well; and they are plainly active even in other places of less extent and less distant from each other [than Greece and Egypt]; although this might seem unlikely. [But it is not so really]; for the S. wind is always accompanied by clear weather in the place of its origin; but the N. wind, whenever there is a great storm, produces cloud in the parts near [its place of origin], but clear weather beyond. And the cause of this is, that by reason of its force it sets in motion a great quantity of air; but the congelation produced by it takes place before it can effect the propulsion of the air so set in motion, and the clouds remain fixed by reason of their weight; and so the force of the wind, rather than its low temperature, is passed on to the parts beyond, and further in advance; and produces the result we have mentioned. The S. wind on the other hand having substance to a less degree, and not congelating it, but propelling it, brings clear weather to those near its place of origin; but it is always more rainy beyond, and blows with force rather when ceasing, than when commencing, because it propels before it only little air at the beginning, but more as it advances; and the air, by being gathered together, becomes cloudy, and by condensation becomes moist.

Moreover, it makes a difference whether the active principle at the beginning be greater or less; for when that is small, the wind is accompanied by clear weather; and when it is great, it produces cloudy and wet weather; because [in the latter case] it compresses together a greater volume of air.

Now, they say that it is not true, but false, that the S. wind [as some assert] does not blow at all in that part of Egypt which is near the sea, nor for the space of a day and a night's journey there from, while it blows fresh in the parts above Memphis, and likewise in places as far from the sea as the distance just mentioned. However, it clearly does not blow as much there, but less; and the reason of this is, that lower Egypt lies low and flat; so that there the wind

may pass overhead, while Upper Egypt is more elevated. Indeed the proximity of its place of origin demands that the force of the winds should be exhibited there; for, such phenomena as these, which happen according to the course of nature, are mostly referable to local causes.

And these winds continue throughout accompanied by cloudy weather, or by fine weather (as the case may be), according to what has just been said.

The proposition that the N. wind succeeds the S. wind, but 9 that the S. wind does not succeed the N. wind, must be considered with reference to the principle which assigns particular phenomena to particular localities. For this law operates with us, and generally with all those who live towards the North; but with those who live towards the South the converse takes place. The cause, however, is the same in both cases. For to the former the N. wind is close at hand; and so is the S. wind to the latter; so that they produce sensation directly that they begin to blow; but make their way slowly to parts farther on.

Now, the Northerly and Southerly winds being, as has been said, the most frequent, each of them is subject to a fixed rule, as it were, determining the periods during which they generally blow in regular order. The N. winds blow both in Winter and Summer, and in the late Autumn until just before the close. Southerly winds blow in Winter and at the commencement of Spring, and the end of the late Autumn. For the motion of the sun co-operates with each, and equilibrium is restored by the air flowing back again. For, whatever amount of air may have been expelled [by N. winds] during the Winter (and the N. winds generally blow then more frequently than the S. winds) and again before Summer by the monsoons and succeeding winds, it is given back to these parts in the Spring and at the close of the late Autumn, and about the setting of the Pleiades in due course. And so it is that the very fact, the assumed non-existence of which has caused some to wonder why it is that there are monsoons from the North but not also from the South, appears really to happen. For the S. winds of the Spring (which they call “white S. winds” from their being usually accompanied by clear weather) are, as it were, monsoons; but at the same time, by reason of their being removed far off from us, they have not been recognised as such; while the N. wind is immediately present to us.

We will now consider the nature of the Monsoon.

Why it blows at this particular season, and for a particular number of days, and why it ceases as the day closes in, and almost universally does not blow at night, are to be explained on the following principles. The movement of the air is caused by the melting of the snow. When, then, the sun begins to break up the frost, and acquire the mastery, the “precursors” blow; and then follows the monsoon. And the cause of its ceasing with the decline of the sun, and not blowing at night, is that the snow ceases to thaw as the sun goes down, and does not melt at all at night when the sun has set. However, [the monsoon] does blow sometimes [at night] when the thaw has been greater than usual; for this must be taken to be the cause of this exceptional occurrence. For at one time it is strong, and continuous; at another weaker and intermittent; and this is because the thaw is irregular. And the moment varies as the mass of matter. And it may be that this irregularity is due to local causes, such as proximity and distance and other variations.

If, then, it is true (as some and particularly the dwellers in Crete say) that the winters are more severe, and more snow falls than formerly — (as proof of which they allege that formerly the hills were inhabited and produced both corn and fruit, the land having been planted and cultivated for that purpose; that there are in fact on the hills of the Ida range and on others, plateaus of considerable extent of which now-a-days they cultivate not one, because they are unproductive; while formerly as has been said they not only cultivated them, but also dwelt upon them so that the Island had a large population; and that at that time showers occurred, but much snow and storm did not) — if, I repeat, this is true which they allege, it follows that the monsoon also has greater duration [now than formerly].

But if the monsoon did ever fail altogether, and Aristæus (as they tell us in the Mythologies) regained it by performing those celebrated sacrifices to Zeus in Keos, it would follow that the parts exposed to the weather were not then so subject, as they are now, to shower and to snow. But if rain and snow are liable to variations, either subject or not subject to some fixed law, there would be, synchronously with these variations, cessation and mutation of the winds.

And it would seem strange if those in the South had not some such relief as this, year by year; considering that their situation is so much hotter.

This then is plain except.... the fruit;.... some are beforehand; others are insensible. These matters must be enquired into.

Now if the genesis of all the winds be the same, and be produced by the same agents through the acquisition of some matter, the sun would probably be that which produces them.

But perhaps that is not absolutely true; but rather that sublimation is the producing cause, and the sun is, as it were, the co-operative. But the sun appears both to set the winds in motion, and to lull them to rest, at its rising; and so [at that time] they often increase or die away. This however is not universally true; but in whatever cases it happens, the following must be understood to be the cause. Whenever the sublimed moisture is less than a certain amount, this the sun overpowers and absorbs; and so causes the wind to cease; but when it is in excess, it makes the movement of the wind more violent by the addition of its own impulse.

Sometimes also at sunset the sun makes the wind to cease, by withdrawing the repulsive motion which it gave earlier [in the day]. And it is clear that this motion has a due proportion [to the force of the sun]; so that on the one hand it does not become spent too soon; and on the other hand the wind is not kept longer in motion by it [than while the sun is above the horizon].

But there is nothing to prevent some winds from blowing even more as the sun goes down; such for instance as those winds which are restrained by heat, and as it were dried up and burnt up by it. And so at noon, for the most part, [the movements of such winds] lose their force; but gather strength as the sun goes down.

The moon produces the same results; but not in the same degree; for it is as it were a sun of low power; for which reason also the endings and beginnings of the lunar months are more terrible at night, and are more stormy [than other parts of the month].

Thus then it happens that winds sometimes rise, sometimes fall, at sunrise; and similarly at sunset; for sometimes it stops them altogether; and sometimes it, as it were, lets them loose. And it would be well to consider whether these phenomena happen according to a regular concurrence, as is the case with phenomena which are to be observed at the risings and settings of the stars.

And from the same cause it is that calms occur very frequently both at midnight and at noon; for if it happens that the air under such conditions at one time conquers, and at another is conquered by, the sun. At midnight it conquers, because the sun is then most distant; at noon it is conquered; but whether conquering or conquered it comes to a halt; and a halt is a calm.

It is a fact also that the cessations of winds occur according to a law. For the winds begin to blow either at dawn or at sunset; and those which begin from dawn cease whenever they are conquered; and they are conquered about mid-day; but those which begin from sunset cease whenever the sun ceases to have power; and that happens at midnight.

Now if some marvel, as at an inexplicable fact, that winds, although they are caused by the impulse of the sun, and, in a word, by heat, should be cold, that which seems to them inexplicable is not a fact at all. For the wind is to be attributed not to the sun simply, but to the sun as, as it were, a co-ordinate cause; nor is it true that movement produced by heat is in all circumstances accompanied by heat and fiery; but [it is so] if it occurs in a particular way. For when a discharge is in the mass and in immediate contact with the discharging agent, it is hot. But when it takes place little by little, and through some narrow channel, then although it is hot in itself, yet the air set in motion by it renders the discharge such [as regards temperature] as the air itself may happen to have been in the first instance.

The breath from the mouth is a sufficient example of this. Some say it is both hot and cold; but they are wrong. It is always warm; the difference is in the manner of emission and escape. For when the mouth is agape, and the breath is sent out in a volume, it is warm; but if it comes out through a narrow opening with more force, and repels the air next to it, and that repels the air next beyond, then if these latter are cold, the current and motion becomes cold also. The same thing happens also in the case of the winds. For when the first movement is through a narrow space, the wind itself is not cold at first; but whatever may happen to be the condition, as regards heat and cold, of the air set in motion by it, such it becomes; if there was heat, it becomes hot; if there was cold, it becomes cold. For this reason winds are warm in Summer but cold in Winter. For according to the particular season such is the air.

It is clear where by reason of the.... it happens to be as it were burnt up. For if where.... wind and desire.... hot or cold nevertheless.... difference of the air.... such as it may be and it appears to be..... And in the actual places of its origin and those adjacent, the current becomes hot; but as we advance further, it is not so to the like extent. Sometimes also a wind coming to us from other parts, if it be from torrid places and such as have a close and burnt up air, appears excessive in its heat. For which reason travellers on the road, and men engaged in the harvest, often die, by reason of such winds, in the fields and in close suffocating places; partly from the air which was there before operating together with the other, and partly from the excess produced by the current and influx.

The following consideration shows that this wind-movement of the air is not simply due either to its being set in motion by itself, or to its being forced into motion by heat. If it were set in motion by itself alone, then as it is cold by nature, and of the character of vapour, the motion would be downwards; but if by heat alone the motion would be upwards; for that is the natural direction of fire. But, as a fact, the motion is as it were compounded of both; for the reason that neither can [entirely] overcome the other.

To this universally general principle, that such as is the air, or the state of “sublimation” in particular places, such will be the winds in regard to cold, the following facts bear further testimony. All such winds as blow from rivers and lagoons are cold, because of the dampness of the air. For as the sun fails [by its inability to pierce the mist] the air becomes colder and the mist at the same time more dense, particularly if the latter arises close by. So that whenever it strikes the body, a sort of shivering is produced.

Un this account also hollow places, and such as are well sheltered from external winds, are chilled by winds arising locally. For the air raised by the sun has neither the natural capacity, nor the power, to remain stationary; and so is borne along and produces a current. And therefore breezes from rivers and lagoons, and generally such as blow off the land, blow at dawn, when the mist is cooling down from the failure of heat. For it is reasonable that this kind of breeze should arise particularly from calm. And they blow still more when there are drizzling rains and moderate showers; for then there is additional matter everywhere for their production; and breezes off the land particularly occur after such conditions.

The Nile is the only river from which breezes do not appear to blow; or if they do, they are very slight, and the reason is that both the place from which, and the place to which, it flows are warm; and breezes exist when moisture is condensing. For which reason also, in no circumstances do breezes come from any one of the rivers in Libya. For they are warm throughout, and it is certain that the same is the case with the rivers about Babylon and Suza, and tropical places generally. And yet they say that the air becomes marvellously chilled there towards dawn. This certainly must be enquired into; for it may be that although the air does become cold, yet it cannot advance and cause a breeze, because the places which would at once receive it are hot.

The “alternating winds” are produced by the land breeze and similar breezes; the damp air being gathered together. For the alternating wind is a sort of reflux of the wind, like the reflux of the water in tidal straits. For when it is gathered up and has acquired volume, it changes again to the contrary direction. These winds occur mostly in valleys, and where “off-shore” breezes blow. There is good reason for both these facts. For in valleys the air as it pours in will be collected; but in open places it is dispersed. Winds too from the land are naturally weak; so that they cannot force their way far. And the reflex action is in proportion to the duration and force with which the winds off the land blow; and it corresponds with them also as to the time of its occurrence, according as these winds blow later or earlier.

There is also a sort of rebound of the winds, so that they blow back against themselves, when they fail to surmount the places against which they blow by reason of the superior height of such places. Thus it happens that clouds are sometimes borne, by an under-current, in directions contrary to the winds.

As for instance in Ægæa of Macedonia, the clouds are carried towards the North, while the N. wind is blowing. The reason of this is that, the hills around Olympus and Ossa being high, the winds fall on and do not surmount them, but are turned back in the opposite direction; so that the clouds, being at a lower level, are also carried in the contrary direction. The same thing happens in other places as well.

Sometimes also, just before the monsoon, contrary winds blow in the opposite direction to the [then prevailing] N. wind by a reversal of the latter; so that by means of them the ships make a return voyage; as happens in fact on

the passage from Chalkis to Oropus; and these winds they call “return N. winds; and this especially happens when the winds are very fresh; for they can make the longest reach at times when the reverse wind has full power.

Sometimes also it happens that, by striking on a resisting object, the wind is parted so that it flows hither and thither; even as water flowing from one and the same opening is divided by an obstacle into two streams.

Altogether there are numerous changes in the winds produced by local causes; particularly the becoming more violent, or more calm, according as they blow through a limited, or an open space. For that which blows through a limited space is always more violent and fresh; just like a stream of water; for when collected it has more force and propulsive power; for which reason, when elsewhere there is a calm, there is always a wind in narrow gorges; for the air cannot remain there by reason of its quantity; and the movement of air is wind. So also when the winds are shut in, or meet in narrow passages and gateways, they blow with keenness; and windows always draw and produce a current. Of all these and such like phenomena there is one and the same cause, namely that which has been mentioned.

Again, some places by reason of their situation in valleys, and being surrounded by greater elevations, happen to be entirely free from winds, although they are near, or nearer than other places, to the sources of the winds; while those that are further off are windy; as happens in Thessaly and Macedonia at the time of the monsoon. For it does not blow at all, practically, in these parts; but it blows freshly enough in the far distant Islands. And the reason is that the former places lie in valleys and are well sheltered; but the Islands have nothing to oppose the current of the wind. And the monsoon, and generally every wind, is prevented from blowing either by distance (for it cannot extend further by reason of the length of the course), or by the interposition of some objects; or thirdly, if a wind of local origin blows the other way with more force.

Now that the rising of the monsoon, and the blowing of the alternating winds over Macedonia, occur simultaneously at a particular time, must be considered as due to some connecting cause. For the winds everywhere cease at mid-day by reason of the sun; but rise again as the afternoon comes on. And it happens that both the rising of the alternating winds against the off-the-land

winds, and the rising again of the monsoon take place at the same period. For I suppose we must not credit the rebound of the wind from Olympus and Ossa with causing the monsoon unless.... or very moderate. However we must endeavour accurately to ascertain in all cases the connecting causes of concurrent phenomena.

There is another matter which might appear strange and unaccountable; that is, why it is that among elevated places, those which face a particular wind do not experience that wind at all; but those which are sheltered from a particular wind do feel it, and that not to a moderate extent but severely. For instance, Platæa of Boeotia lies towards the North, and there the N. wind is but a light air; but the S. wind is strong and stormy, although Kithæron stands as a barrier before the place. Again, before the monsoon the alternating winds pass by the low lying lands of Euboea; but at Karystos they blow in such a way, that their force is extraordinary. Once more, in that part of Kurias which is called Phæstum, which lies towards the South and is high and precipitous, a marvellous wave breaks in from the sea; but there is no wind; but the ships even are anchored to the....; the parts in the neighbourhood having no harbour; and there they can watch events. And the reason why the wind does not reach the land is that the air [on the land] does not give place, or flow away by reason of the height towards.... not surmounting. But that the air must always move away, and must not remain stationary [in order to admit of a wind blowing] is plain. For in rooms whenever one closes the [inner] doors, the current of air through the windows is reduced; for the room being full of air, and not providing an exit [for the air already within it], does not allow the outer air to enter. For the movement of air is towards a void; and for this reason the expression “draught” is not well used.

— But the reason why places sheltered from the N. wind (or generally from any particular wind), feel [that] wind more [than places not so sheltered] is that the wind is as it were piled up, and at last overflows, and falls on the place in a mass; for whenever it falls it comes down in a mass like a cataract. And it is in such places that squalls occur; for here are swirlings and massing together; so that when it bursts forth it comes down as it were with a blow. For when the wind is massed together, it is violent and non-intermittent; as also is the case with whirlwinds.

Such and the like are the occurrences due to local causes. But there are many things which occur in many different places, to speak of which separately would require a volume.

The following phenomena have relation to all winds in common, being such as in each case afford indications when the wind is about to blow.

The air varying in its opacity in proportion to its density or rarity, or in proportion to its heat or cold, or in proportion to some other condition, always indicates the coming current. For the conditions of the air sympathise with the movements of the wind, and precede the winds in affecting our senses.

So — also in regard to the sea and waters, it is possible to observe the same indications; since the waves lifting and breaking [before the wind comes] indicate that winds are coming. But they are propelled not without intermission, but at intervals; and one wave propelled by the wind propels another; and is again propelled by another puff of wind, when the first had died away; and so being thus constantly propelled they arrive at the shore. But when that which is set in motion has arrived, it is clear that that which set it in motion will presently come.

It also happens that the waves continue after the winds have ceased; for they die down and fade away later; because that which is more difficult to set in motion is also more difficult to bring to a state of rest.

The following also are common indications of the majority of winds; such as the appearance of shooting stars, and the appearance, fading away, and breaking up of parhelia, and other such phenomena. For the upper air manifests, by the manner in which it is affected, the propagation of the wind before [it is perceived below].

Again, the blowing with greatest force at the end (which is a common feature of most winds) [is an indication to be observed]. For when they blow as it were in a mass, there is little left to come.

Such then are what have been called common and essential characteristics of the winds.

Each wind has its own peculiarities, corresponding to its particular nature and position; some of which are attributable to the places across which, and to

which, their currents are directed; others to their originating causes: and others to other such reasons.

The most striking peculiarities in fact are those of the E.N.E. wind (Kaikias) and the W. wind (Zephyros). For the E.N.E. wind (Kaikias) alone attracts the clouds towards itself as the proverb says: —

“To himself he gathers alway, as doth Kaikias the clouds.”

— The W. wind (Zephyros) is the most gentle of all the winds; and it blows in the afternoon and towards the land, and is cold; and it blows in two seasons of the year only, namely Spring and late Autumn. There are places, however, where it blows with storm force; whence the Poet called it “ill-blowing.” But in some places it is moderate and soft; whence Philoxenus in his poems spoke of its “sweet breath.” Some fruits also it brings to maturity; others it thoroughly spoils.

The reason [for the peculiarity just mentioned] in the case of the E.N.E. wind (Kaikias) is, that it is its nature to move in a curved line, of which the concave side is towards the sky, and not extended over the earth, as in the case of other winds; for this wind blows from below; and blowing in this way towards its commencement, it attracts the clouds towards itself. For towards whatever point the current is, thence also is the movement of the clouds.

The W. wind (Zephyros) is cold because it blows from the West, and from the sea and open plains; and still more so because it blows just after the winter, in spring, when the sun is only just acquiring power; and in late autumn, when the sun has no longer power. But it is less cold than the N. wind because it blows from water in the state of being converted into wind; and not from snow in the like state. And it is intermittent because the wind as it is produced is not under control. For it does not [wait] as winds do on the land [to gather substance], but wanders hither and thither because it has come upon a moist surface. And it is uniform and soft also for this reason; for it does not blow off hills, nor from snow rapidly thawed; but it blows easily like [water] flowing through a pipe. For the regions of the N. wind and the S. wind are mountainous; but to the West there is neither hill nor land, but the Atlantic Ocean; so that it is borne on to [and not from or over] the land. And it blows in the evening, by reason of its place of origin; for all winds are produced concurrently with the sun diffusing or sublimating moisture through, or into

the air, or co-operating towards their initiation. Whenever therefore the sun arrives at that particular quarter, then also does the current from that quarter begin to flow; and this same W. wind — (Zephyros) ceases at night because the motive force of the sun then fails. And it brings the greatest clouds, because it blows from the ocean and along the sea, so that it collects them from a great space. And it is stormy and “ill-blowing” for the reasons already explained; for it blows after winter while the air is still cold. On the other hand the W. wind (Zephyros) of the late autumn is not of that character; unless we predicate storminess of a wind according to its force; for it does blow with force in some places quite near to others where it has not such force; just as other winds do. And perhaps its stormy character must be understood in this way; and not as being general; unless indeed it be that some writers interchange the names, and call what is really Thraskias (or the N.N.W. wind) Zephyros (or the W. wind). But this must be further investigated.

Its evenness and softness, where these are present, cause a certain grateful sensation as it moves and passes by; so that when this is its character, it is pleasant.

But as to its destroying some fruits, and making others thrive; that is true of it as a general proposition; and the same thing can be said generally of other winds as well; for a wind makes fruit thrive in Summer when it blows cool, and destroys it when its blast is hot. And similarly again in Winter and Spring, when the wind is cold, it destroys; but when warm, it nurtures; and so in each case, it exerts a preserving power by having a condition of air opposed to that of the season. This happens when the wind is from the sea. For the sea is warm in Winter, and cold in Summer; and for this reason it is that the S. wind has this character in some places; as in Argos; and the N. wind likewise in other places.

What we have now said of this W. wind is its ordinary and common character. But the peculiarities which it exhibits in particular places must be examined; and examined from the point of view of the particular situation, and other circumstances of the place. For the difference will be found to arise almost entirely from local causes. For instance in Italy, Locris and the adjoining country prospers under the W. wind; because it strikes upon it from the sea. But there is another part which does not do so well; and some places are even blasted by it. And again, in Crete, Gortyna thrives under it. For it lies

spread out, and the wind strikes upon it from the sea; but another district of that Island on which the wind strikes from off the land and off certain hills, is destroyed. And in the Maliaic Gulf it destroys all the seedling crops and the tree fruit; and so too around the Pierian District of Thessaly. The natural configuration of both these places is the same, and the surroundings are similar; for both lie towards the East, and are surrounded by lofty hills; the one by Ceta and the hills connected therewith; the other by Pierus. So the W. wind, blowing from the quarter where the sun sets at the equinox, deflects the warmth which strikes from the sun on the hills, and turns it down directly on to the plain, and burns it up. And it acts similarly in other places in which such or the like circumstances occur; and the contrary happens in converse cases. For this, which we repeat again and again, is true absolutely; that it makes a great difference, and especially in respect to heat and cold, through what, and from what quarter, a wind blows. For instance, the reason why the S. wind is not less cold than the N. wind, as the saying is, is that the wind passing through air left as yet chilled and damp by the winter, must, when it strikes upon us, have the same character as the air itself. And the “N.-wind-after-mud” which makes a storm, as another proverb tells us, does so for the same reason; for the air when rendered moist is cold.

So also are breezes from rivers cold as has been already mentioned.

The peculiar features of these winds can thus be rationally explained.

But that winds blow in Winter and in the morning from the East, and in Summer and in the afternoon from the West is to be explained on the following ground. When the sun attracting the air can no longer control it, then the air is released and flows along; and so, as it sets, it leaves clouds behind, whence flow the W. winds; and whatever air it draws with it, becomes, to those who live in the lower hemisphere, a morning wind; and conversely when it sets in the lower hemisphere, it causes W. winds there; but to those here, a morning wind from the air which follows on with it.

For this reason also, if the morning wind find another wind blowing; it becomes greater; for it adds to it.

And as the W. wind is always, and over a considerable area, blowing with those who dwell in the West, so do other corresponding winds blow with those on the other side of the world near our dawn, which is their sunset.

These results in fact happen under similar conditions to the inhabitants of each hemisphere, and the wind-current, just as the rain and other phenomena at the extremities of each area, arises according to circumstances; not indeed by any absolute law, but as a general rule.

The S. wind is accustomed to blow at the rising of Sirius, just like any other periodic event. And the reason is that the lower part of the atmosphere is heated by the presence of the sun; so that much vapour is produced. And these periodic S. winds would blow considerably, if they were not prevented by the monsoon from so doing; but, as it is, the monsoon prevents them.

N. winds arising in the night blow themselves out at the third day; whence the proverb runs: —

“A North-wind rising in the night Never sees the third day’s light;” because the winds that begin from the North in the night are weak; for it is apparent that the amount set in motion when it blows at a time when the heat is but small, cannot be much; for little moves little; and they all end in three days; and those that are of the least force end early on the third day.

That this same result does not happen also when the S. wind blows as a night wind, is to be accounted for by the fact that the sun is near the region that lies towards the South, and the nights are warmer there, than the days are towards the North; and the amount of air set in motion during the night is great; in fact not less so than in the daytime. While the hotter the days are, the more do they, by drying up the moisture, prevent the S. winds blowing.

And it may be that the reason in the case of the N. wind is that it bursts all of a sudden as squalls do; and sudden winds quickly cease:

“For from a weak beginning no great end can come.” The N. wind is also as a general rule violent; and so is the S. wind after snow and hoar frost, whence the proverb:

“After Frost hoar Southern winds roar;” because both [snow and hoar frost] fall when a sort of fermentation and purification has set in; and after fermentation and purification there is a change to a contrary condition of things: and the S. wind is contrary to the N. wind. With this agrees the fact that after rain and hail and such like falls, winds drop; for all these, and such as these, are a kind of fermentation and purification of the air.

But as cloudy weather, or clear weather, accompanies each wind, according to the country whence it blows and to local causes, so there are some proverbial sayings which relate to certain places only; as for instance that about the W.N.W. wind (Argestes) and the W.S.W. wind (Lips), which they use mostly about Crete and Rhodes; "Lips is the wind that makes quickly the clouds, and quickly the sunshine; "Cloud follows Argestes, all the way unto its end." For in the places just mentioned the W.S.W. wind quickly produces either result, according to the state of things which exists when it begins to blow; and the W.N.W. wind quickly overcasts the sky.

In some places also there is a sort of sequence of the winds; so that one blows after the other, if the first continue a certain time. And perhaps it is not very strange that, granted the circulation of the winds is always towards those next to them in order, there should on the other hand be also a change over to those of the opposite direction. For there are these two kinds of a change; one when the winds shift round; the other when the winds [that are blowing at first] blow themselves completely out [and others arise]. Of these, the variation by shift is when the E.S.E. wind (Euros) shifts to those next in order of place; and this variation is the less in degree; and when it happens, there is frequently a recurrence to the same point as before, when a storm causes an uncertainty of direction. The variation by changing over is when the wind flies round to the opposite quarter.

This naturally happens in the case of all winds; and in these cases the compensation and reflux, as it were, is such as we should expect; an instance of which exists in the "off-shore winds as the counterpart of the "alternating" winds; and this order of variation is, in many places, of practically daily occurrence.

But in some places the counterpart is not an "alternating" wind, but some second wind from the sea as happens in the Gulf of Pamphylia. There, in the morning, a wind called "Dyris" blows with much force, from the river Idyrus; and it is followed by the S. wind (Notos), and the E.S.E. wind (Euros), and when they beat against each other mighty waves arise; the sea is dashed together; many a flash of lightning falls; and the ships are wrecked. For in every case whenever such a conflict of winds happens, mighty waves arise, and there is a great storm; as when, with contrary winds blowing, they say "There is a battle of the winds." In fact it is but likely that, whenever they attack each

other before they have blown themselves out, it should cause a storm; for the one adds, as it were, substance to the other.

This is more particularly evident in the case of the N. wind; for this wind is of a more stormy nature, and immediately appropriates the substance that is brought in its way [by another wind]. And in the same way the S. wind is wont to saturate, and make rainy, any other wind that it conflicts with.

In some places also the S. wind seems to cause snow storms; as is the case in the neighbourhood of Pontus and the Hellespont, whenever the N. wind has been so cold that it continues freezing the moisture brought up by the S. wind; at least it more frequently freezes than thaws.

The foregoing are what may be called the winter successions and oppositions of the winds.

But the confusion of winds that happens at the rising and setting of Orion happens because, at times of change, everything is naturally liable to get into confusion. Now, Orion rises at the beginning of Autumn and sets at the beginning of winter; so that as there is no established season for the time being, one in fact commencing and the other ending, the winds are of necessity uncertain and confused, because they stand on, as it were, debatable ground between the two seasons. And so it is that this constellation has acquired the reputation of being fierce, both when setting and when rising, by reason of the indefiniteness of the season; for it needs be that it should be disturbed and irregular.

Such, and such as these, then are the phenomena that occur in the air and throughout the Heavens; others are connected with our own conditions. For instance, with Southerly winds men find themselves more weary and incapable; and the reason is that, instead of a little, a great deal of moisture is produced, being melted out by the heat; and so instead of a light air, there is a heavy damp. Again power and strength reside in the joints; and these are relaxed by Southerly winds. For the lubricating matter in the joints when congealed prevents our moving ourselves; but when too fluid prevents our exerting ourselves. Northerly winds will produce a certain balance, so that we are stronger and can exert ourselves more.

Again, Southerly winds, when dry and not rainy, produce fevers; for being naturally warm and moist they induce in our bodies a warm moisture that is

foreign to them; and such a condition is feverish; for fever is due to the excess of both these two conditions. But when these winds are accompanied by rain, the rain cools the system.

In the same way, whatever else affects the habits of our bodies depends on one or other of these conditions and such things are very numerous, and are observed in numerous persons; but the causes of all are the same, or very nearly so.

So, too, in the case of fruits, and other such like things; for all the effects which they exhibit are to be referred to either moisture and diffusion, or density and consolidation, and other conditions of one category or the other.

So, too, in the case of inanimate things; such as the breaking of lyre-strings, the cracking open of glued articles, and other occurrences which happen as things become moist and slack. For instance, in the manufacture of iron they say that they can beat it out further with a Southerly wind than with a Northerly; and the reason is that Northerly winds dry up and make hard, but Southerly winds moisten and soften; and everything is easier to work when it is softened, than when it has become somewhat hardened. At the same time, however, [the smiths] are stronger and more active in Northerly winds.

As a general proposition the causes of such phenomena as these are quite evident, for the consequence follows rationally from the active principles. But there is sometimes, in the case of either wind, matter for doubt and enquiry; for instance, if neither hardness nor dryness nor recurrence is exhibited with northerly winds, but the opposite conditions appear; and similarly in the case of the S. wind. For that which is contrary to reason requires a cause to be shown for it; but men accept what is reasonable without a cause being shown for it; for they are clever at supplying what is wanting.

But that winds, when they are cold, dry up moisture more quickly even than the sun when it is hot, and that the coldest winds do so most of all, must be understood to be due to this cause, namely, that they produce vapour, and carry it off as they produce it; and the colder winds do so more than the less cold; while the sun produces it and leaves it when it is produced.

Why can it be that it is said: —

“Fear not as much a cloud from the land as from ocean in Winter; But in the Summer a cloud from a darkling coast is a warning”?

Can it be because in winter the sea is warmer than the land, so that if a cloud is formed over it, its formation is obviously due to a powerful active principle? For otherwise it would have been dissolved by the air by reason of the warmth of its situation; while in Summer the sea is cold and so are the winds from the sea; and the land is warm; so that if a cloud is borne from the land seawards its formation must be due to some active principle more powerful than usual; for the cloud would have been dissolved, if the active principles had been weak.

That the S. wind does not blow freshly in Egypt for the distance of a day and night's journey from the coast, is utterly untrue. But it is said that the N. wind and W.N.W. wind most of all the winds there cover the sky with clouds, and the S. wind bears them away; that winds in the dawn bring clouds, and overcast the sky until the sun has risen; but that it does not rain, because the clouds have no place on which to settle; that the S. wind and the S.E. wind and the other winds from the Southern quarter begin to blow at sunrise, and follow round with the sun; but that the N. wind and the W.N.W. wind begin at sunset, and travel round towards the sun-rising.

In Sicily they call "Apeliotes" (the E. wind) what we call "Kaikias" (the E.N.E. wind); some, however, think that it is not the same wind, but a different one; because the one overcasts the sky, and the other does not. Some indeed call "Argestes."

"Olympias"; others "Skiron and the Silicians call it "Derkias; and some call Apeliotes" (the E. wind) "Hellespontias; the Phoenicians call it "Karba" and those in Pontus call it "Berekyntias."