

On the peculiar state of the atmosphere during the progress of the late epidemic, cholera and diarrhoea / by Thomas Pollock.

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*From the Original
Respect*

ON THE

PECULIAR STATE

OF THE

ATMOSPHERE

DURING THE

PROGRESS OF THE LATE EPIDEMIC,

CHOLERA AND DIARRHŒA.

By THOMAS POLLOCK.

LONDON:

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1854.

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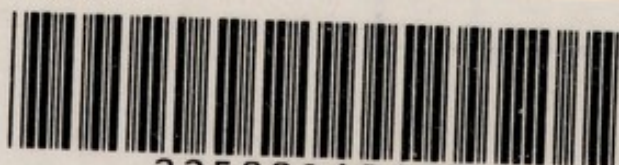
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ON THE
PECULIAR STATE OF THE ATMOSPHERE
DURING THE
PROGRESS OF THE LATE EPIDEMIC, CHOLERA
AND DIARRHŒA.

INTRODUCTION.

The late Epidemic was mysterious in its nature, and by many it was taken for granted, that any attempt to elucidate it would be useless: unfortunately this class was numerous, and moreover took great credit to themselves for the extent of their sagacity. This delusion in its practical effect is most mischievous, tending to prevent the employment of those means fortunately within our power to arrest its progress. Having been most favourably situated to observe it, I think it right to put upon record certain facts which presented themselves, whereby a repetition of the errors of the past may be avoided, and a well grounded hope for the future established.

STATE OF THE ATMOSPHERE.

ALL the Symptoms of this Epidemic, however various, seem clearly traceable to the Atmosphere. By the Atmosphere is meant the plate of Air between the surface of the Earth and the lower surface of the Clouds opposite, and our attention is required to the alternate influence which each of the two latter, exercise upon the opposite surfaces of the former; and more particularly to the lower surface of the said plate, that being the one in which we exist; its particles being at one time in a state of expansion, at another, in a state of constriction. The latter is the most important, as being that most directly influential during the Epidemic.

Expanded state of the Atmosphere. When the Earth and Air are free to re-act between themselves, as after the setting of the Sun, when his direct influence is removed, and no clouds above; heat passes from the Earth to the Air, owing to the capacity as it is technically termed for heat, of the

latter being greater than that of the former. This must be the fact, on account of the more ready expansibility of the Air; thus 100 volumes of Air, at the freezing point of Water, become 137 at its boiling point; while under similar circumstances the volume of the Earth undergoes no sensible change. We must not suppose that the heat thus given off from the Earth, heats the Air, for it does just the contrary, it expands the Air, thereby increasing its capacity to absorb heat, and consequently cools it. This is attested by the attendant phenomena of dew, hoar frost, mist and fog; all generated by this attendant cold. The admirable observations of Dr. Wells,* and also those of Mr. Read,† bear witness to this same fact. The absorptive power of the Air, under these circumstances of expansion, is truly wonderful, but is what might be expected from the diminution of pressure always attendant upon the act of expansion. Instances of this absorptive power of the Atmosphere during this act of expansion, are continually presenting themselves to our notice; perhaps over-night the ground may be saturated with moisture, during the night frost may set in; in the morning a blue sky, the clouds gone, or very few, the moisture of the over-night has disappeared, the pavement dry, except a few lines or patches of ice. The perspiration although insensible from the body, may be great, but no moisture on the skin except violent exercise be taken. Hence from this extreme dryness from expansion, chapped hands, colds, asthma, catarrh, influenza, inflammations and complaints of excitement, may prevail; but probably it may now be in vain to look for Cholera.

Constricted state of the Atmosphere. Here the phenomena as regards the lower surface of the Atmosphere become reversed. The Earth loses its influence; the clouds are now present; they now exercise the same influence over the upper surface of the Air adjoining them, as the Earth in their absence did over its lower surface, as already shown. How this preponderating influence of the clouds is brought about, I will now endeavour to show; and the importance of this, to the explanation of the leading phenomena of the Epidemic, can scarcely be over-rated. The aqueous invisible vapour in the Atmosphere, during condensation into the visible cloud, undergoes condensation equal to $\frac{1}{1600}$; thus assuming a less, for a greater capacity for heat; this heat thus liberated, expands the surface of the Air adjoining it below, increasing its capacity to absorb heat, not heating it, be it particularly observed, but producing cold; to the intensity of which, the hail produced under these circumstances bears witness. The effect of this is, that heat is drawn into this expanding upper surface of the air from surrounding parts, and from the lower surface of the same plate of Air; whose particles thus by abstraction of their former quantity of heat, are thus brought into a state of constriction, and diminished capacity. This heat thus rendered free, we feel in our own persons. The phenomena are such as exist previous to a thunder storm. Languid sensations, muscular power weakened, moist, clammy perspiration on the skin, weak appetite, tendency to nausea, reluctance to motion—Cholera may now be looked for. The constricted Atmosphere refuses to take up the perspiration,

* See Wells Essay on Dew, 1815.

† See Read's Summary View of the Spontaneous Electricity of the Earth and Atmosphere, 1793.

hence the moist, clammy sweats; it refuses to take up animal emanations, offensive odours from sewers and drains; hence the frequent complaint of these, during the continuance of the Epidemic. It refuses to take up the effluvia from animal and vegetable matter in a state of decay, such as from grave yards, phosphuretted and sulphuretted hydrogen. Thus all these matters, which in an expanded Atmosphere would have been absorbed, carried off, decomposed, or destroyed, are now confined to the lower layer of the Atmosphere, and as it were tied down to the surface of the Earth. Strong in their affinity for oxygen, they absorb that principle, taking up that vital air essential to our existence, and thereby become competitors with our lungs. Hence the existence of Cholera and other diseases of depression. Such as the above must be the result of the cloud—first, expanding the upper surface of the plate of Air—and secondly, by its inductive power, throwing the lower surface of the same plate into the state of constriction, as above attempted to be pointed out. As a necessary consequence of the disturbed equilibrium of the plate by the cloud, latent heat must pass from the lower constricted, toward the upper expanded surface, and there accumulate, and continue to do so as long as the clouds go on increasing. Remove the cloud, away goes the disturbed equilibrium. The accumulated heat returns to the Earth. Flash goes the lightning. Thus the effect is instantaneous, but the disturbance of the equilibrium may have occupied days, or as long as the cloud has been forming. During the continuance of the Epidemic, the Atmosphere was in a state of disturbed equilibrium—blue sky appeared but occasionally, and when it did so, came an abatement of the complaint.

The Epidemic was local in its action. Thus those neighbourhoods on the alluvial of the River Thames, were more affected by it than those on higher ground. Thus it was very general in Lambeth, Walworth, Peckham, Camberwell, Bermondsey, Rotherhithe, Deptford and Poplar. Here all the above accumulated causes of mischief have been more energetic, aggravated by a system of Sewerage, from a want of fall necessarily imperfect. Here the moisture must be continually ascending and condensing, and at a certain height constitute a hazy veil or canopy, thus affecting on a smaller scale what the clouds do upon a larger one; that is, increase the constriction of the lower Atmosphere; hence the greater liability of the inhabitants to be affected by the greater local mischief in their neighbourhood.

Pressure of the Atmosphere influenced by the two above states. It follows as a necessary consequence that the pressure in the lower surface of the Atmosphere must be greater as its particles are less distantly apart; accordingly it is greater during the state of constriction than that of expansion. This is the most important, from the direct influence thus exercised over the Perspiration, which must be inversely as this pressure. This carefully kept in view, will enable us to observe the concatenation of the phenomena, which this Epidemic presents; and convince us that they are more obedient to physical laws than to any mysterious or unknown cause.

SYMPTOMS ATTENDING THE EPIDEMIC.

Hot and Cold Symptoms intermitting, Soreness on the surface of the body, more particularly over the Loins and across the Abdomen, drum-like tension

and tightness of the Abdomen, caused by accumulated gas, eructations generally sour, appetite weak, nausea and occasionally sickness, weak muscular power, clammy perspirations on slight exertion, relaxation of the Bowels, those symptoms popularly called Bilious, attended by a dry Mouth and bitter taste, are rarely absent. I here state the following Symptoms as experienced by myself: appetite failed, relaxation of the Bowels, griping, tension of the Abdomen, sickness, first sweet, and then strongly acid, eructations frequent, almost continuous. These yielded to cretaceous, alkaline and opiate Medicines.

CHEMICAL ACTION IN THE BODY DURING THE EPIDEMIC.

Obstructed Perspiration. This, as already shown, arises from the constricted state of the Atmosphere, refusing to absorb the moisture from the Skin, sufficiently to carry off the excess of animal heat. Hence all the other symptoms arraying themselves as cause and effect in a species of concatenation, forming, in a scientific point of view, a beautiful whole.

Formation of Acid in the Stomach. The Perspiration being, as shown above, obstructed, that heat which by the great capacity of the Gaseous Perspiration would, when in a state of health, have otherwise been carried off, is now retained in the Body. This higher temperature favours the production of Acid. Thus under analogous circumstances, at a certain temperature, a Saccharine Solution undergoes the Vinous Fermentation; at a higher temperature the Acetous Fermentation. Hence the Acid Eructations, Flatulence, and disturbed Digestion, which were the more general symptoms, and in some slight cases the only ones present.

Indigested Matter purging the Bowels. The Acid Matter above referred to, on passing into the Bowels dislodges noxious gases; hence the distension, tightness, drum-like sensation and soreness across the Abdomen. There is great reason to believe that Sulphuretted Hydrogen is present in these gases, being disengaged by the action of the acid passing from the Stomach. Some years since, in the neighbourhood of Long Acre, a man was found dead in a privy; a difficulty occurred in attempting to account for his death; but some of the neighbours afterwards stated, that having occasion to use some strong Sulphuric Acid, or Oil of Vitriol, the quantity left unused was thrown into the sewer. This would disengage Sulphuretted Hydrogen in a most concentrated form, and previous to its having become weakened by mixing with the atmosphere: hence the apparent cause of the man's death. A farther argument for the view here taken: On the former visitation of the Epidemic in 1849, a Gentleman at Walworth suffered a severe attack of Diarrhœa. He stated, that the odour of his breath reminded him of Harrowgate Water. Now he knew the flavour of Sulphuretted Hydrogen, as he was in the habit of taking occasionally artificial Harrowgate Water. If Sulphuretted Hydrogen get into the Lungs, free Oxygen can scarcely exist there. This may explain the leaden hue of the complexion, and the predominance of the dark venous over the light florid arterial blood. Thus the Epidemic is intimately connected with a deficiency of free Oxygen. Hence the use of Chloride of Lime or of Zinc, which are beneficial by their action in rendering Oxygen free.

TREATMENT INDICATED BY THE ABOVE CHEMICAL ACTION.

This becomes simple. The restoration of perspiration hitherto obstructed, by means of fresh air and diaphoretics. A case in point. A Gentleman residing near the Elephant and Castle, had repeated attacks of Diarrhœa, but on certain nights slept at Woolwich Common; on those occasions he had no Diarrhœa; thus proving the influence of elevation of site and fresh air. The neutralization of the acid in the Stomach, the next point of treatment to be observed. Hence the benefit from Cretaceous, Alkaline Medicines, Ammonia, &c. The employment of Medicines yielding Oxygen. Purgative Medicines were tried under the idea that some peccant matter wanted purging from the bowels. This treatment did not succeed, and Castor Oil, about the mildest of this class, even in small doses, did no good. Many were the instances of Diarrhœa brought on, or aggravated by this treatment. The fact was overlooked, that the Stomach by allowing a portion of the food to pass undigested, thereby became itself the manufacturer of a Purgative. Hence the Diarrhœa. A purgative treatment, under such circumstances, would be like giving a dose of Scammony to work off a dose of Jalap, which a man might be supposed to have taken already in excess. This bears a strong resemblance to the Homœopathic doctrine, that like remedies cure like diseases.

PREVENTION OF THE EPIDEMIC.

Restriction in the quantity of Food, thus adapting it to the weakened power of the Stomach; to avoid every thing difficult of digestion; to supply the Lungs with as much free Oxygen as possible, therefore to avoid overcrowding in small habitations, breathing of animalized atmospheres, such as exist in crowded bed rooms. Hence many of the attacks during the night. In all probability, to the neglect of these precautions may be mainly attributed the prevalence of the Epidemic in the neighbourhood of Golden and Soho Squares. It is not at all unlikely that the lives of many of those persons might have been saved, by compelling them to sleep in the open air in blankets. But perhaps the best mode of convincing the mind of the sceptic of the advantages of avoiding animalized atmospheres, and of obtaining fresh air, is for him to read Anson's and Cook's Voyages, and contrast the two; where nearly all the crews of the former died of disease; with the latter, the deaths were only such as might be expected under ordinary circumstances.

CHANGE IN THE STATE OF THE ATMOSPHERE ON THE TERMINATION OF THE EPIDEMIC.

The Epidemic commenced about the end of June, and gradually increased until the middle of August. It remained with nearly equal intensity until the middle of September, when it gradually diminished until the end of the month. Its termination, which was rather abrupt, was attended by a most remarkable circumstance; as already observed, the lower surface of the Atmosphere had been in a state of constriction, with slight variation during the three months. On October 1st I had occasion to go to Langdon Hills in Essex; travelling in the morning by Railway to Tilbury and Stanford le Hope; all the low lands

were enveloped in a haze or light fog, sufficient to prevent objects being seen at any great distance; at Langdon Hills the Atmosphere was tolerably clear, but on account of the fog below, no object could be discerned beyond three or four miles, consequently the splendid view from that locality could not be seen. On returning by the Railway in the afternoon, the fog had rather increased; and in the neighbourhood of the Lea River, objects on the ground, such as cattle, although not many yards distant, could scarcely be seen. The appearance in the River Lea itself was highly instructive; the vapour rose from it as from boiling Water: this phenomenon spoke in language not to be misunderstood, that the state of constriction of the lower surface of the Atmosphere had departed; the clouds had lost their inductive influence; that of the Earth had been restored. The lower surface of the Atmosphere was now in a state of expansion, with diminished pressure and increased capacity, sucking up as it were the Water from the River, and by the cold generated by this increase of capacity, quickly separating it in a visible form, producing the fog.

Thus terminated the Epidemic, thereby proving that it owed its existence to the previous state of constriction of the Atmosphere.

CONCLUSION.

It is hoped that sufficient has been stated to conviction, that the phenomena of the Epidemic are clearly traceable to the Atmosphere. Thus the constriction of the Atmosphere disturbs the digestion—generates the acid—disengages noxious matter in the bowels—purges them, producing Diarrhoea and by its absorption interferes with the healthy circulation.

If it were necessary, much more evidence might be adduced, and the laws of capacity, more fully gone into. It might have been shown that the phenomena of light, magnetism and electricity, are all obedient to the same laws, which would lead us to that higher law, that of vibration, which they constitute; and to which in all probability, matter itself is obedient.

THOMAS POLLOCK.

Nov. 6th, 1854.

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