PROVINCIAL MEDICAL & SURGICAL JOURNAL.

LECTURES ON PUBLIC HYGIENE AND MEDICAL POLICE.

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LECTURE III.

Having spoken on general climate, and on water and fuel, as influencing public hygiene, we shall now proceed to notice topographical climate, and the atmosphere of towns, as far as they may be thought to influence the public health of the inhabitants. Notwithstanding the great elements of climate depend upon the latitude and longitude of the country or place, and on the more or less proximity to the sea, inland lakes, or to great mountain ranges, and whether the country is insular or continental; yet as far as salubrity or unhealthiness is concerned, it is found that much depends on topical modifications of site and exposure. Thus, though the whole island of Great Britain has one general characteristic climate—having a mean range of temperature from about 45° to 55° of Fahrenheit, and being possessed of more or less humidity, yet it contains many points of subordinate climate, which differ from each other very considerably, as places of residence, in respect of salubrity; and still more especially as they affect invalids, and people labouring under certain predispositions of body. In former times, these distinctive climates of our country were more particularly manifest; as the fenny countries of Lincolnshire and Cambridgeshire were more remarkable for endemic ague, and Derbyshire for congestive growth of the thyroid gland or bronchocele, than they are at present.

Even on the same parallels of latitude we find the climates arising from the annual difference of the weather, to differ a good deal. Thus Yorkshire has a drier and somewhat colder climate than Lancashire, owing, in some measure, to a difference in geological structure—there being none of the lias, oolite, nor chalk formations on this side of the dividing chain of hills, while these run up far into Yorkshire on the other side: but the difference of climate chiefly depends on the eastern side of the island being first exposed to the dry and cold winds that come off from the continent, but which are much ameliorated before they reach the western

side. These winds, in the winter and spring months, are below the temperature of the German ocean, and that of the lower atmosphere of the land which they first reach; consequently, when they become more or less warmed, they are farther removed from their dewpoint, and give rise to dry weather. In the latter part of summer and in autumn, they arrive in a relatively opposite condition; they are hotter from the effects of radiation from the heated surface of the continent; they, therefore, if they have not at the same time imbibed much vapour, absorb it from the German ocean, and again deposit it on the coasts of Yorkshire, which are cooler than the continental lands, and so lead to condensation of their convected vapour. Hence fogs and heavy rains will occur on these eastern coasts, when there are none at the same time in Lancashire.

On the western side again, the climate is much influenced by the western winds. For while the Pennine chain of hills moderates the intensity of the cold eastern winds to us, the western winds, which generally prevail, keep our atmosphere moist, and expose us to much wet weather. In winter, and even in a cool state of the weather, these western winds bring much rain, while in summer and under a warm temperature they bring clear and fine weather. In the former case, as they previously sweep over the Atlantic ocean, which in these latitudes is never below 52° to 54° of temperature, throughout all seasons of the year, they arrive on these islands saturated with aqueous vapour nearly up to these points; but, as at these seasons, the surface temperature of our land is below these points of oceanic temperature, the consequence is, that these winds are reduced in temperature, their hygrometric or dewpoint is encroached upon, they cannot hold their convected vapour, and so it is precipitated in rain, while the country to the East may have very little or none at the same time. In summer, again, these winds carrying the same temperature and amount of vapour from the Atlantic ocean, on arriving on these islands, are heated by the solar rays above their constitutional temperature; they, therefore, become more warmed, their dewpoint is removed farther from their acquired temperature, and they come upon us dry, but soft and balmy, owing to the vapour they still retain. Many of the problems of

weather and climate in these islands may be explained on similar theories, founded on the direction of the winds, and the consideration of the surfaces over which they blow.

The general health in some parts of the kingdom appears more to be influenced by personal habits and modes of diet, than by anything that properly belongs to climatorial agency; such as the greater prevalence of calculous disorders in Norfolk and the neighbouring counties than in other parts of England or in Scotland, and the endemical frequency of what is called the Devonshire colic in some of our western counties. The cause of the former has been attributed by some to the potable water containing more alumina and lime than elsewhere, and by others to the more general use of wheat flour, taken in an unfermented state, as in the quantity of flour dumplings, which are eaten by the agricultural classes. The Devonshire colic is mostly confined to the cider counties, and may be fairly attributed to drinking the fresh or acid cider, which is manufactured in leaden presses and vats.

Topical climate is, however, much modified by exposure to the sea, the neighbourhood of hills, and the aspect of the place to the cardinal points, including the comparative elevations of the places above the level of the sea. Though much exaggeration has been committed by many hygienists in writing upon the local climates which they wished to recommend for residence and for invalids, which if we were fully to believe, it would appear that this island contains a sample of every blissful Baia that can be found on the face of the earth; yet there is no doubt, but several of these noted places possess many varieties of climate, so far as the invalid is concerned, and as tending to promote longevity. For instance, Malvern, though not far from Cheltenham, has a very different climate; it is bracing and cooler in its atmosphere, while Cheltenham is much warmer and more relaxing. We may, also, in this manner, compare Torquay with Brighton, and Harrogate with Leamington; but I shall leave the nicer distinctions of the climates and hygiene of these and other similar places to the more refined inquiries of a Clark, a Johnson, and a Granville—names well and justly appreciated as leading writers on this subject.

In a general view, when practically applied to the choosing of a site, either for a private dwelling, a workhouse, barrack, or other public building, it should be our recommendation to select a spot gently elevated above any general plain around, with an aspect to the south-east or south-west, and based, if possible, on sand, stiff marl or clay, or on chalk—avoiding the contact of the solid rock. The situation should also be, if possible, to the southern or western side of any wood that may be in the neighbourhood; and if marshes or swampy land cannot be avoided, the site should be to the eastward of them, as the dry easterly winds are the

more apt to imbibe any miasmatic emanations from these places. If in the neighbourhood of a large town, on the contrary, the site should be to the westward of it, as from the greater prevalence of the westerly winds, we will by this means be kept freer from smoke than if placed to the eastward.

In choosing any sites at the bottom of cliffs, or the base of hills, it should be our object rather to choose one situated on the outcrop of any rocky strata, than one on the dipping plane of the formation, as in the former case, our foundation will be kept much drier and freer from surface water. The vicinity of the sea is another important element in marking out a station. In hot climates the sea-breeze mitigates the heat of the day, and renders it endurable; and in temperate climates, the temperature is more equable than a site in the interior; but then, in either climate, a great extent of muddy heath is not desirable; and, above all, the neighbourhood of a marsh, into which sea-water occasionally enters, is to be rejected, as such marshes are observed to be more pestilential than mere fresh-water swamps.

A site in recently cleared forest land is more to be avoided than one on the very verge of a growing wood, or where the cleared land has been long under cultivation. It is observed, in North America, that many parts of the denuded forest country are now much more unhealthy than when they were covered over with trees.

We come now to make some hygienic observations on the atmosphere and other topical circumstances which affect the health and physical comforts of the inhabitants of towns and villages. Much has been observed, and reported on this important subject, of late years, both by private pursuers of science and philanthropy, and by public topographers under Government commission. Though great utility has resulted from many of these enquiries, yet a good deal has been advanced on something like gratuitous assumption. A want of chemical and meteorological information, and of strict reference to something like scientific deduction, has characterized several parts of these reports. Certain local atmospheres have been condemned as unhealthy, without any data from chemical or other evidence; while the insalubrity thus pronounced has been attributed by others, as wise and as enquiring, to the poverty and destitution, moral and physical, of the inhabitants affected. It is much to be regretted that our chemical analysis and our eudiometers are yet so imperfect, as not to enable us to detect those atmospheric contaminations which are productive of disease. If they were more perfect in this respect, we should be saved much vagueness and uncertainty in our conclusions, and much difference in many of our assumptions and reasonings. In default of these exact criteria and instruments of investigation, we must make the best and most philosophical use of the means we possess in judging of the insalubrity or deleteriousness or

otherwise of the sites or urban districts that may be the objects, at any time, of our inquiries.

Though the atmospheres of our large towns share, in common, in the general climate which characterizes the surrounding country, and partake equally in all the more marked and sensible of the meteorological changes that prevail over the adjoining districts, yet each large town may be held to possess a climate more peculiarly its own. When we consider the physical condition of such a town as Manchester along with Salford, having a population, as by the last census, of 262,627 inhabitants and containing within its precinct so many manufacturing and chemical works, which are constantly, we may say, emitting into the incumbent atmosphere a multitude of gases and fumes, some innocent, many noxious to health, and others merely disagreeable or foul, we may be well prepared to conceive how much the local climate must be modified, if not greatly deteriorated by such circumstances. And if we still further reflect on the amount of carbonic acid gas and unconsumed carbon that are given off by our household fires, along with the amount of carbonic acid gas which is evolved by the respiration of so many human beings and animals that are congregated together, we may be surprised that such overcrowded and teeming places are fit for the healthy abode of any human being.

I have made some calculations on this subject, which may serve to illustrate the extent of this apparent enormity.

From a tray of water of the area of 204 square inches, which I placed on the top of my house, which was at some distance from any manufacturing chimney, I gathered, in seven days a deposit, weighing, when dry, 200 grains, which is nearly equal to one grain on every square inch. This is equal to 896 lb. for the acre, and which will be 256 tons for the square mile, which superficial extent will only include about the third of Manchester, Chorlton, and Salford. These 256 tons for seven days will give 36.57 tons of a deposit of soot, dust, and other exuvia being precipitated every 24 hours down on our streets, houses, and heads. I have also calculated the amount of the exuvial excretions that are given off daily by a population of 262,627 individuals, and allowing four ounces of feces to be excreted by each individual, young and old, (as Liebig found from observation of a number of adults that $5\frac{1}{2}$ ounces were daily voided,) we shall have 65,657 lbs., or about $29\frac{1}{2}$ tons for the daily amount of human excrement. And taking only 20 ounces of urine to be voided on an average by the young and adult, (as Dr. Prout allows 32 ounces as the average quantity for a grown person,*) we have 32,828 gallons, or 14 tons of urine thrown off into our cess-pools, sewers, and streets, every 24 hours.

This, however, is not all; we have another addi-

* Professor Johnson allows 27 ounces of urine to be daily passed by each individual.

tion to our atmosphere of a much more reputedly noxious element, which is elicited with an unremitted regularity, and that is the carbon that is exhaled in the form of gas from our lungs and skin. This is calculated at the lowest for our population, to amount to the enormous quantity of 131,314 lbs. daily. I have taken eight ounces of carbon as the average for each individual, Liebig and several others reckon 14 ounces as the quantity excreted by an adult daily from his lungs and skin. M. M. Andral and Gavarret, from their late experiments and observations, have found that the average amount of carbon exhaled from the lungs, in all ages of the male sex, is nearly eight ounces (troy) daily, and that for females is near seven ounces (troy). The highest amount for males, is between 20 and 40 years of age, being $9\frac{1}{2}$ ounces, and that for females between 38 and 50, being about seven ounces.

Taking into view this enormous mass of carbon that is daily thrown into the atmosphere, in the shape of carbonic acid, conjoined with that given off by the brute animals in the place, and the necessary great quantity of ammoniacal and hydro-sulphurous gases that are extricated from the ready decomposition of the excreted urine and feces, it may well excite our surprise, as it puzzles our philosophy, how animal life is at all maintained in health and integrity under these conditions. When we only calculate that, as eight ounces of carbon evolved by each individual takes twenty ounces of oxygen to form carbonic acid gas, so will the above-mentioned quantity of carbon evolved from the population, viz., 131,314 lbs., require 328,285 lbs. of oxygen, which again will form about 3,910,000 cubic feet of carbonic acid gas daily set afloat into the atmosphere into this town and neighbourhood, from this source alone.

Considering, I say, this enormous contamination of the incumbent air, and that, by very correct experiments, especially those of Mr. Coathupe, and Dr. Reid, animals die in an atmosphere where five per cent. of oxygen is replaced by as much carbonic acid; and that they become sick, and ultimately die, when replaced only by three per cent., we may conceive that there is a highly provident power in nature to render such enormous volumes of this deleterious gas, if not altogether innocuous to the health of the inhabitants, at least, quite compatible with comfortable existence, and the feeling of little or no inconvenience. One great preventive means employed by nature, is the law of diffusion, by which all gases have a tendency to permeate and spread themselves among other gases or vapours, arising from a repulsion between their own atoms and their tendency to occupy the interstices of other gaseous bodies. To understand this subject in its full and important length, we refer you to the already time-honoured and confirmed discoveries and views of our venerable townsman, Dr. Dalton.

This provident diffusion of carbonic acid gas, and other vapours, is also much promoted by the continued ascensional currents from the relatively heated air among our streets and court yards, and more immediately and perfectly effected by the almost daily currents of wind sweeping through the atmosphere. Another very powerful means supplied by nature for keeping the air in its normal state, and which is indeed much promoted by the very character of the urban atmosphere itself, is the rain that falls on the place. The affinity of water for carbonic acid is great, so that it will absorb its own bulk of this gas. The effect then of a shower of rain, after dry weather, is to precipitate or wash out of the atmosphere and carry away to our sewers, all the excess of carbonic acid gas that may have accumulated in its lower strata, or not have undergone that wider diffusion which time or aerial currents would have accomplished. Our own sensations testify to the exhilarating effects of a shower of rain in the town as much as in the country, it is undoubtedly more beneficial to health; for it has been observed since the days of Percival, that this town and the neighbouring country are more healthy in wet seasons than in dry ones. In the country rain acts more beneficially, in all likelihood, by repressing the exhalations from the soil, than from its precipitating the smaller proportion of carbonic acid gas that may have accumulated near the surface. This purifying effect of rain on the atmosphere of towns is not confined to washing out the carbonic acid gas, it also easily absorbs and precipitates the ammoniacal gas and any dry sulphurous acid gas that may be formed. The former of these latter gases, the ammoniacal, is found in considerable quantity in our atmosphere before a fall of rain. I have readily detected it in rain water, to which is added a little muriatic acid, evaporated to dryness, when, by adding caustic lime to the residue, a very sensible extrication of ammoniacal vapour is given off. The source of this ammonia, no doubt, arises from animal decomposition, and principally from the urine of the inhabitants and their domestic associates. It is this impregnation that renders our rain water, that is caught in cisterns, so very soft, notwithstanding its very dirty state, and dark appearance.

The great source of the hydro-sulphurous acid gas, which is also found, in varying quantities in the air, is from the combustion of the low and impure coal that is generally burnt in our steam furnaces. Being coal mostly from thin seams, and often shaly, it contains a good deal of sulphur in the form of pyrites, which is the chemical result of decomposed animal remains, now more or less in a fossil state. This gas is readily detected in the atmosphere; by exposing some slips of litmus for a few hours to the air in an open place, they will soon become reddened.

Besides the immense volumes of these invisible gases that are daily poured forth into our atmos-

phere, and that of similarly populous and industrial towns, from the thousands of animal furnaces and the hundreds of inorganic sources of combustion continually in operation, we have a visible and palpable nuisance, if not a noxious material, contaminating the atmosphere all around to the evident injury at least of vegetation, and that is smoke. Hygienists are not agreed on the extent, if any, to which this Tartarean contamination of our atmosphere is prejudicial to public health. We are very certain it is exceedingly injurious to property of all kinds, and entails thousands of pounds of expense to the inhabitants in counteracting its injuries to their personal cleanliness and household property and effects. That there is much and reckless waste of combustible matter in the mode in which manufacturing furnaces is conducted is evident, as it amounts in some well ascertained cases to near one-third of the coal supplied, but that the waste, in the form of smoke, beyond the inhalation of sooty particles, and the soiling of our persons and wardrobe, is prejudicial to the public health, or increases the amount of mortality, is not so well ascertained. To produce the same steam power, nearly the same quantity of coal must undergo combustion in any case, and consequently the same quantity of carbonic acid gas will be liberated into the atmosphere, but assuredly the waste might be saved to the furnace proprietor, and the general feeling, if not the actual amount of salubrity be promoted.

It is not merely the smoke which is offensive and injurious, which is nothing but the carbon precipitated by the cooler air, from the hydro-carbonaceous gases elevated by heat without a due supply of the necessary element of combustion, the oxygen of the air, but along with the smoke there are also emitted into the surrounding atmosphere, great quantities of the carbonic oxide, which is quite as unfriendly to animal life, as the carbonic acid.

This contamination of our urban atmospheres, from being now perfectly gratuitous, is the more to be reprehended, as it might be effectually prevented; and the continuance of the nuisance and injury, after the means, scientific and mechanical, which have been fully and satisfactorily pointed out, ought to subject every delinquent to indictment. Among other plans more or less effectual that have been proposed and adopted in many places, that of Mr. Williams appears, both on principle and on inspection of it in operation, to be efficacious in every respect. This consists in admitting a regulated supply of air beyond the bridge of the furnaces, by which the combustible gases are all burnt, and nothing but aqueous vapour and carbonic acid gas are allowed to escape by the chimney.

There can be no doubt, if such a plan were universally adopted throughout our large manufacturing towns, but that the local atmosphere might

be preserved in a state, infinitely purer, and the condition of the air over Manchester on Sunday, which is comparatively clear and pure, abundantly testifies the assertion. We must also observe, whatever the climatorial condition, in any season, the surrounding country may be in, such large towns as Manchester have a factitious one, more peculiarly their own, and which no doubt modifies their state of salubrity and longevity. This factitious atmosphere, beyond being based on the general climate of the country, is much modified by the local caloric that is generated by so many human beings, the multitude of household fires, manufacturing furnaces, and steam engines. Much of this surplus caloric, in clear weather, is radiated into the higher atmosphere; but when the weather is the least cloudy, it is not so readily dispersed, but reverberates through the lower strata of the incumbent air, and so produces that close and stifling sensation so frequently at such times complained of. This is not all; this comparatively heated air is charged with that hygrometric vapour which is due to its temperature, and when it follows its natural ascension, and meets with the cooler atmosphere which is the general climatorial one at the time, condensation of this vapour takes place, either in form of a fog, a smoky cloud, or in a drizzling rain, while the surrounding country remains clear, or is only visited by a passing shower, accompanied by some current of wind. It is thus that there is often rain in Manchester when there is none in the vicinity around, and our fogs in the latter part of the year are more prevalent than in the surrounding country. Our fogs at that period, and indeed at other times, when the upper atmosphere is very cold, generally, do not appear early in the morning, but about nine o'clock; they have their maximum intensity about noon, and either fade off or entirely dissipate by the afternoon. In the morning early, our local atmosphere, from radiation through the night, has been brought to the nearest point of equilibrium of temperature with that of the air above and around the place, the air is therefore clear; but after so many fires have been in operation for a few hours, the local atmosphere gets increased in temperature, its point of saturation for vapour is correspondingly augmented; when this warm air ascends, it soon meets with the greatly colder atmosphere at no great elevation; its due point is soon obtained; and so a precipitation of these low fogs takes place, which only give way to solution by the solar rays, acting with their maximum force in the after part of the day.

Considering, then, the abovementioned local and factitious elements, along with some others of minor note, which affect the meteorology of large manufacturing towns, our natural enquiry, as public hygienists, is, how far healthiness and longevity are affected by them, and by what means any injurious or offensive results from them may be remedied or

prevented. That they produce any special and general disorders of themselves, or that they give rise to, or increase the intensity of any of our epidemic diseases, there is no proof. In fact, some have asserted, and not without reason and experience, that such an atmosphere is favourable to some asthmatic disorders, and that the murky and heated air of our cotton-mills was a shield from the epidemic cholera to the operatives employed in them. To the acclimatized inhabitants, such local atmospheres of themselves, rather tend to induce a lower state of tension in the nervous and muscular powers, oscillating frequently between health and derangement of function, than to the production of any special disease. I will not attribute to these meteorological causes the prevailing disorders of the nutritive organs, but rather to intemperance, poverty, and errors in diet; for where even the poorest and sickliest, and those who may be said to be broken down in constitution, are put under a regulated system of simple food and drink, as in our Workhouse, very few disorders of the nutritive organs make their appearance, absolutely, or in comparison with other diseases affecting the chest, heart, nervous, and muscular systems; and those that exist on admission readily yield to treatment. Good diet and improved moral and religious habits, will change the alleged insalubrious character of many places.

To show that there are some other causes tending to deterioration of human life among the inhabitants in these manufacturing towns than meteoric ones, we may compare the rate of mortality in Manchester and Salford with that in Liverpool, which is very differently situated, and having not near so many manufacturing establishments to load the air with the products of combustion. By the last Registrar's report, the rate in Manchester and Salford is 3.46 per cent., while in Liverpool it is 3.537 per cent., which exceeds the former by 97-1000 per cent. In Leeds, again, which would seem to be more allied to Manchester, in its meteorological condition, the rate is only 2.712 per cent. to the number of inhabitants. The amount of smoke and dust in the atmosphere we can readily appreciate, both in their injury to property and person, but it is not so easy to ascertain the extent and kind of injury which the invisible and factitious gases thrown into the atmosphere have upon the health and longevity of the inhabitants. There can be no doubt that in dry weather and from the want of ventilation, they accumulate, in some parts, to a very noxious extent, notwithstanding all their constitutional tendency to diffusion.

In low situations, carbonic acid gas is very apt to exist in more than its normal quantity in the atmosphere, and in one instance I witnessed its fatal accumulation during one night in a recently sunk shaft of about 20 feet deep, sunk in the area of a manufacturing establishment in this town, and

where no old well nor sewer had been broken into. The gas might certainly have reached the shaft by the horizontal seams of sand and marl, but this was not ascertained. The circumstance showed that this gas either permeates the substrata from the sewers, or is apt to run off from the surface to the lower repositories in the vicinity. When we take into consideration the enormous volumes of this gas alone that are daily emitted into the atmosphere of the town, we may legitimately infer that, in the absence of rain, of ventilation, and with no growing vegetable surface to absorb and fix it for the nutrition of trees and plants, it will accumulate to an extent that is injurious to the health of those exposed to its influence. It has been surmised, even by the noted Evelyn himself, that trees and plants are favourable to human health, and tend to purify the air to the inhabitants of towns. With this view the trees in St. James's Park were first planted; and now, when we know how vegetables are nourished at the expence of the carbonic acid gas in the atmosphere, we can easily see how they tend to purify, as it is called, the atmosphere, and keep it better fitted for respiration.

There is no doubt but that squares and rows of trees growing through our large towns, would not only be a most pleasant ornament and shade, both in showery and sunny weather, but they would also, to some extent, act as scavengers of our polluted atmosphere; but the difficulty is, to make them grow. This difficulty does not however wholly depend on the gaseous state of the atmosphere in our towns, though plants are found to wither and die where the atmosphere is charged with a very large proportion of carbonic acid, but it is owing to the smoke and other earthy particles which load the air, and by closing up the pores and spiracles of the stems and leaves, impair their absorbing and transforming functions. In New York and Philadelphia, both very large towns, but where few manufactories are established, I have seen trees grow well in the streets and squares. In many of the continental towns the same is observed, and if we could divest our atmosphere of smoke, there is little doubt but our large towns might possess nearly equal comforts and enjoyments.

Our large towns have, seemingly grown up, to their present enormous proportions, with an utter disregard to the compensating actions and re-actions of nature; for we may well conceive that if timely provision had been made for the reservation of open spaces, planted with trees and shrubs in different parts of the town, and that we had anticipated by some years, the mode of preventing, rather than of consuming smoke, we might, by this time, have had our atmosphere kept in a much purer state, by so many of these squares and clumps of vegetation, acting as so many lungs to give increased life and vigour to the inhabitants. To have the most effective and salubrious

benefits from trees and plants in the midst of towns, and indeed near dwellings anywhere, they should be planted in open places, where they may receive the full effects of a wide exposure to the sun's rays; for it is only in such circumstances that plants exert their purifying function in their more beneficial operation. With solar light and heat they only absorb carbonic acid and give out oxygen, while at night and proportionably in dark and shaded places, their organising powers are at rest or impaired, and more or less carbonic acid is, on the contrary, evolved.

FATAL POISONING FROM FIFTEEN OR TWENTY DROPS OF THE ESSENTIAL OIL OF BITTER ALMONDS.

TO THE EDITOR OF THE PROVINCIAL MEDICAL AND SURGICAL JOURNAL.

SIR,

The use of the essential oil of bitter almonds for domestic purposes has now become so general, and it has lately been so frequently resorted to as an effectual means of self-destruction, that it behoves the members of our profession to take every opportunity of exposing its great power and dangerous properties. The following case presents a striking example of the fatal effects it produces, and if you agree with me in thinking that the smallness of the quantity here taken is sufficiently well ascertained, it is also a case of considerable medico-legal importance, and you will oblige me by inserting it in your columns.

I remain, Sir,

Your obedient servant,

HENRY GRAVES BULL, M.D.

Hereford, August 5, 1844.

On Monday morning, July 29th, I was sent for, in a great hurry, to see a woman who "had taken something, and was dying." It was five minutes to eight o'clock when the messenger came, and before the hour had struck I arrived with a stomach pump at the bedside of the patient. I found her in a room at the top of the house. She was lying in her night shift on the bed, quite insensible, and scarcely alive. Her head was on a high pillow, bent over the chest, and hanging to the left side, as if by its own weight. The face was extremely livid, the lips were separated, the teeth clenched, and there was much froth about the mouth, running over the cheek. The eyes were half shut and glassy; the pupils rather dilated, and directed upwards; both were irregular, the left one particularly so; and the iris of both was immovable. The regular respiration had ceased, but at short intervals the chest was expanded by convulsive action. The action of the heart had not entirely ceased, but its pulsation was exceedingly feeble, indeed scarcely perceptible. I could not detect any pulse at the wrist. I did not notice any smell in the room on entering it, or whilst making the above observations. She had the appearance of a person dying from disease of the heart, apoplexy, or epilepsy, and I asked of the person there; how she knew that anything had been taken; and bid