PROVINCIAL MEDICAL & SURGICAL JOURNAL.

LECTURES ON PUBLIC HYGIENE AND MEDICAL POLICE.

Delivered at the Manchester Royal School of Medicine and Surgery.

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LECTURE 1st.

We shall now engage your attention in the few following lectures, to some subjects of great public and social importance, which from the increasing interest and value now attached to them, both by the Government and municipal committees, are sufficient to engage our attention and consideration. Though the objects of public hygiene and medical police are not so closely allied and interwoven with those of the medical practitioner as several of those departments of forensic medicine which we have noticed; yet, as they can only be intelligibly and usefully considered by one who is professionally educated, and as they usually form no unimportant section of such similar courses of lectures as we have attempted to deliver, we should feel ourselves inexcusable if we altogether omitted them. There are many reasons of an increasing nature, why everything relating to the public health and to medical police should be more studied; for the increase of population, and that in denser masses than formerly, with the decreasing means of subsistence on the one hand, and the greater luxury and attention to social economy on the other, while the philanthropy of the age is ever ready to suggest objects and measures for its exercise, all call upon us to investigate what is injurious to public health, and to alleviate by all scientific means, the sum of human misery or unhappiness.

To acquit ourselves of this collateral duty of our profession, the public too gratuitously think, that the medical knowledge acquired in our medical schools, at the table of the anatomist, and in the laboratory of the chemist, is all that is necessary for to deliver a just opinion or to superintend any practical measure on this subject. A man, however, may be well acquainted with medical literature, he may be an excellent bedside practitioner, and a clever and eloquent professor, yet all these acquirements will not of themselves qualify him to be a fit and practical public hygienist or medical-police director. To be really useful, he must besides have an extended knowledge of natural

and chemical philosophy, of the soils to which his attention is directed, and of the geology of sites and neighbourhoods. He must also be acquainted with much exactness, with the effects which different trades have on those who exercise them, and with the important action of the several manufactories on plants and brute animals, as well as upon man. Statistical knowledge of life, disease, and mortality, must also form an important part of his acquirements, along with the frequent habit of visiting the abodes of art and manufacture, and the practical acquaintance with the details of mechanical and chemical processes on the greater scales. The habits and modes of domestic life and economy, among the industrious, working, and pauper classes, should also form a very necessary part of study and acquaintance to confer weight and confidence to any opinion or measure emanating from a professor or witness on the particular subjects belonging to public health or medical police.

For the more systematic understanding of these subjects, we shall then call your preliminary attention to some of the principle circumstances which affect the health of communities; and the first of these is climate. This principal circumstance chiefly depends on the temperature of the atmosphere, the hygrometric state of the air, and the force and direction of the winds. The temperature of any place is well known to depend, in a great degree, on its latitude. The inclination of the earth's axis to the plane of its orbit has served to diffuse the influence of the solar rays more extensively over the surface, than if the same points had always a vertical sun shining upon them. We may also easily conceive, what a difference in temperature would ensue at different seasons of the year, if the axis of the earth were either a little more inclined or a little more perpendicular than it is. If it were more inclined our winters would be colder and longer, and our summers hotter than they are; and if more perpendicular, then our two opposite seasons would be more equalized, but the tropical regions would be steadily more heated. The fossil remains of terrestrial vegetation in these temperate regions and as far north as Melville Island, all of which show a tropical character, might be explained by the earth's axis in primeval

ages being more inclined to the plane of its orbit than it is at present. The changes in temperature had been marked long before there was an instrument for measuring their extent, and hence we have the earth's surface distributed into parallel zones and called climates; but this theoretical arrangement was found to accord ill with observation, for different climates were observed to occur under the same parallels of latitude. The average or mean temperature of any place is now obtained from a series of thermometrical observations, carried on in the open air, and in the shade, throughout the year; and to procure the most correct average, the mean of several years should be taken. Water from deep springs or caverns, remote from volcanic or thermal influences, gives a very near index, by the thermometer, of the mean temperature of the place under observation. It has also been found that a series of observations taken at nine in the morning throughout the year, or at every hour during the month of April, will give a pretty accurate mean temperature of that place for the whole year.

Temperature is also considerably modified by longitude; thus it is found that the mean temperature of any latitude in western Europe is higher than that of the corresponding latitude in eastern Asia. The same difference is observed on the two sides of America, as may be seen by inspecting Baron Humboldt's chart of isothermal lines. A comparison of similar observations indicated to Sir David Brewster, that there were, in each continent, certain meridians on which the mean temperature is lowest in that parallel. These he termed the cold *meridians*, in approaching to which the mean temperature falls on either hand. Without taking further notice of this modification of climate, we may advert to one great cause that influences this unequal distribution of temperature; and that is the relative disproportion of land to water, and especially where a great extent of land is continuous with the polar regions. We may also notice that the eastern sides of all the great continents maintain a lower mean temperature than the western sides, but to what this is owing it is not easy to determine; perhaps the rotation of the earth from west to east may have some cosmical effect on this difference of temperature under the same parallel.

The principal circumstance, however, which modifies the effect of latitude as to temperature, is elevation above the level of the sea. As we ascend a mountain, the temperature falls, and in every region of the earth, if the mountains were sufficiently lofty, they would be found the abodes of perpetual congelation.

The limit of perpetual snow varies with the latitude; it is highest under the equator, and diminishes as we approach the poles; thus the point of perpetual congelation at the equator, is more than 15,000 feet above the level of the sea, while in

Britain it is about 5000 feet. As we, however, recede from the equator, considerable oscillations occur in the curve of congelation; for in the Himalaya range, there is a difference of no less than 4000 feet between the limits of perpetual snow on the northern and the southern sides of the mountains. As we proceed towards the temperate zones, we find, in mountains beneath the line of perpetual snow, immense bodies of ice, or glaciers, which are permanent throughout the year to all appearance, though they are owing to constant additions from above, while solutions at their lower borders are continually taking place; thus every portion in succession after its deposition at the top descends to be dissolved, while the form and situation of the glacier are permanent.

The law of the distribution of heat through the atmosphere is very uniform, and from a great number of observations in different parts of the world, the mean results are, that for every 100 yards of altitude, the thermometer of Fahrenheit sinks one degree. This uniform ratio is said by some accurate observers to be somewhat modified, by the altitude increasing in a greater proportion than the temperature decreases, thus, if the first 252 feet be equal to one degree of decrement, the next 255 will be equal to another fall of one degree; 258 to the third degree, and 261 to the fourth, and so on.

By the same law the temperature increases with the descent from the level of the sea, and is found to exhibit an augmenting ratio to the bottom of the lowest mines, being at the rate of one degree Fahrenheit, to about every 16 to 18 yards of descent. I need not enter into the explanation of the causes which determine this law of increase and decrement of temperature in the atmosphere. It simply depends, as you will recollect, on the different capacities of air under different densities for caloric; the denser the air, the less capacity it possesses for heat, and the rarer it is, it has the greater capacity. Thus a pound of air at the surface of the earth will feel warm, or give out heat, but transfer this same pound to an upper stratum of the atmosphere, it will expand from less pressure, and by expanding will absorb heat, which becomes specific, and so produces cold both to sensation and the thermometer.

We thus have noticed that climate is greatly, if not chiefly influenced by latitude, by longitude, and also by elevation.

The purity of the air is nearly the same in all parallels of the earth's surface, and at all elevations, it is only disturbed or impaired by local impregnations, and modified by temperature and the quantity of aqueous vapour which it may hold in solution. So wonderfully are the constituents of the atmosphere balanced together and united, that whether the air is analyzed from the top of the highest mountains, or from the lowest plains, it is found to be composed of exactly the same

ingredients, and in the same proportions, so as to warrant the idea that the whole is a chemical combination, and not a mechanical mixture of gases. The most authenticated analysis is as follows:—

	Measure.	Weight.
Oxygen in 1000 parts	210.0	233.2
Nitrogen	775.0	755.5
Carbonic Acid	0.8	1.0
Aqueous Vapour	14.2	10.3
	1000.0	1000.0

The proportions of the two main constituents are not, on good authority, found to vary but a fraction in the open air all over the globe, but the quantity of carbonic acid is found to vary a little, and that of aqueous vapour is generally in proportion to the temperature.

Air from the top of Rivington Pike, in this county, at the height of 1300 feet above the sea level, has been found to contain one and a half volume less of carbonic acid in 10,000 volumes than air experimented on 800 feet lower. Notwithstanding the very irregular evolution of these several constituent gases into the atmosphere, arising from the growth of vegetables in summer, under the open rays of the sun, giving rise to the greater production of oxygen gas, and from the respiration of congregated animals, both brute and human, and above all from the great masses of combustion going on in many places, and producing great quantities of carbonic acid gas; yet such is the conservative principle in the atmospheric ingredients, that from the repulsion of their respective molecules to each other, they are soon diffused through the whole aerial mass; and any undue production of any one of them, in one point, is forthwith disseminated through the interstices of the molecules of the others, until a constant and uniform mixture is maintained. This general law of diffusion does not, however, absolutely prevent such temporary and local accumulations of some of these ingredients, as may be injurious to animal life and health, as we shall notice when we come to speak of special sites and climates.

I may mention another curious result of the independent, yet regulated condition of these gases, that of the whole pressure exerted by them, each exerts its own force, thus of the 30 inches of mercury supported, nitrogen sustains 23.36 parts, oxygen 6.18 parts or inches, aqueous vapour only .44 of an inch, and carbonic acid only .2 of an inch, each being in proportion to its quantity.

Though the oxygen and azote of the atmosphere preserve nearly a uniform ratio to each other, yet as I have stated, and owing to the much greater specific gravity of carbonic acid gas, which is 1.527, while oxygen gas is 1.111, and azote 0.9722, this heavy gas does not so readily diffuse itself from the foci of its generation, as is felt at the Grotto del Cani, near Naples, at a lake in the Cordilleras, and another in Java, over which a bird can scarcely fly without being asphyxiated. This gas will remain a long time undiffused in the bottom of

shafts, wells, in low sinks and cellars, whereby the human health and life is at times impaired, and put in jeopardy. In dry weather it is apt to accumulate in low courts and underground cellars in large towns, especially if they are situated near, or surrounded by, processes requiring much combustion, and where charcoal furnaces are in operation. I have detected a marked difference in the quantity of lime water precipitated from air taken from the top of my house, and from the cellar floor, after a long season of dry weather. There are various modes of testing the quantity of carbonic acid in the air, by causing it to be absorbed by either lime water, pure barytic water, or by a solution of caustic potass. When we use lime water to any measured quantity of air, we collect the precipitate, which is carbonate of lime, weigh it, and for every 6.25 grains of it we allow 2.75 grains for carbonic acid; or multiply any weight we get by 0.44, the product is the weight of carbonic acid. As 100 cubic inches of carbonic acid gas, under mean temperature and pressure, weigh 47.4691 grains, it is easy to calculate the cubic inches of gas that may be contained in the air experimented on.

In our large towns, such as Manchester, where many processes of manufacture are going on, requiring the combustion of much coal, two other chemical ingredients can easily be detected in the urban atmosphere, and these are ammonia and sulphuretted hydrogen, or the hydro-sulphurous acid gas. The former of these I have found to prevail in a considerable quantity in the air of this town, after periods of dry weather, by simply evaporating a portion of water impregnated with a little hydrochloric acid that has for some time been exposed to the free atmosphere, when, by adding caustic lime, fumes of ammonia will be perceptibly evolved. The quantitative analysis I have not yet ascertained.

The sulphuretted hydrogen is also easily detected by transmitting portions of the air through a solution of acetate of lead, when a dark precipitate will appear, and may be collected to ascertain the relative proportions. This gas may also be discovered in the air by exposing to it a slip of litmus paper, which in a few hours will be reddened. This change will also be occasioned by carbonic acid gas, when it is very prevalent. The exact operating agency may, however, be ascertained by a few subsidiary tests. One great cause of the disengagement of these adventitious gases in our urban atmospheres, is the immense disproportion of inferior or engine coal, which naturally contains much more sulphur and azotic exuvia than our poorer bituminous coal used for household purposes.

Another important constituent of the atmosphere remains to be noticed, and it is one that principally gives the character of *weather* to it. This is the hygrometric state of the air. This state bears a chief consideration in all that relates to climate, and forms one of the most popular objects of atten-

tion to the hygienist and invalid. The proportion of aqueous vapour varies greatly, and is dependent on temperature and pressure. The air at the poles contains the least of it, and at the equator it is at a maximum. Thus the elastic force of vapour at 32 degrees is only one-fifth of an inch, while mercury is 30 inches, or it weighs only the 1-150th part of what an equal bulk of air does at that temperature. Again, the elastic force of vapour at 60 degrees is 0.516, or above half an inch, and it weighs one-sixtieth of an equal bulk of air, while at 212 degrees its weight is to that of air as 5 to 8. So, therefore, the warmer the climate, there is more aqueous vapour in the atmosphere, but it is normally far short of the point of saturation, else rain or fogs would be continually occurring in warm countries.

It is very necessary to be acquainted with the meteorological results of air being mixed with vapour in different proportions, which as we have said, depends on temperature. For example, when a cubic foot of air at 32 degrees, and having an elastic force equal to 30 inches of mercury, is mixed with a cubic foot of vapour at the same temperature, and having only an elastic force of one-fifth of an inch of mercury, the volume that results is not two cubic feet, but only 1.0066 feet. Hence, the addition of vapour to air adds little to its bulk, and consequently diminishes but little its specific gravity. Again, two volumes of air at different temperatures, but each fully saturated, will produce two volumes, having a mean temperature, but the mixed tensions of the vapour will not be a mean, but above it, so that there will be a condensation or precipitation of the vapour, thus:—

1 vol. of air at 60°, having its force		
of saturated vapour . . . }		.524 in.
1 ditto at 40°, ditto . . .		.263 in.
. . . mean tension . . .		.393.5
Mn. temp. 50° . . . real tension . . .		.375
		18.5

Thus 18.5, or say 2 is only at 50 degrees equal to 1-1500th part of the bulk of the air engaged, and would produce but little vacuum from condensation. According to Dr. Dalton's tables of tension it appears, that though the mean temperature of the air at the equator is 80 degrees, the point of saturation with vapour is 19 degrees below this, or in other words, it requires air carrying vapour from the earth to ascend to the height of from 6000 to 7000 feet before it suffers its moisture to be condensed, and this only when the ascending air is nearly saturated.

The quantity of rain, as well as its mode of falling at any place, has a considerable influence on its climate. The most reputed wet situations are not those at which most rain falls during the year. The mean annual rain in the West Indies averages 120 inches, though for six months at a time none may fall. At Calcutta the average is 81 inches; at

Rome 39; at Liverpool 32; at Edinburgh 24; at Glasgow 30; and at Manchester, according to Dr. Dalton, 35,117 inches has been the average for 49 years. Some most extraordinary falls of rain have taken place in some places in very short periods of time. Thus:—30 inches fell at Genoa in 24 hours, in Oct., 1822; 29 inches at Joyeuse, in 22 hours, in Oct., 1827; and at Gibraltar, in Nov. 1826, 33 inches fell in 26 hours.

The quantity of vapour, its force of tension, or what is called the dew-point, is estimated by hygrometers of different kinds, as Leslie's and Daniel's; but Dr. Dalton's simple mode is perhaps as correct as any. The quantity of rain is measured by the rain gauge. There are different forms of them also, but Professor Phillips' hemispherical discs exposed to the four cardinal points with a horizontal one at top, with gutters to them, seems to offer the best test of the fall of rain either in calms or storms.

Adverting then to the foregoing elementary consideration of the constitution of the atmosphere, as to temperature, nature of the normal and adventitious gases, and the vapour which is always more or less a modifying agent, we may easily infer, irrespective of experience, how animal life and all the contingencies of health may be affected by atmospherical conditions. Thus temperature alone will have a great effect on the physiology of respiration, and through this function, on the oxygenation of the blood and nutrition. The capacity of the chest in any adult may be said to be a constant quantity. At every respiration the volume of air that enters the lungs may be considered as uniform, and consequently the oxygen which the air contains, at any temperature will be constant. But as the temperature varies, so will the weight of air differ as to its volume, therefore the quantity of oxygen will vary also. Air being expanded by heat and contracted by cold, will contain unequal weights of oxygen to the same volumes of air. In summer or in a warm climate, therefore, the lungs exercising the same number of respirations in a minute, and the same volume of expansion, will pass less air and consequently less oxygen through the lungs than they will do in winter or in a cold climate, using the same mechanical exercise. In the former meteorological conditions, the air is more saturated with vapour, which displaces a proportional volume of air; therefore we see that temperature alone, and more so with a greater hygrometric state of the air, will much influence the functions of the lungs, and consequently the health of the animal.

As the air, when dry, is found to expand at the rate of 1-4688th part of its volume for every degree of Fahrenheit, it follows that the air, in being heated from 32 to 80 degrees, or to the extent of 48 degrees, will be dilated to above 1-10th of its volume, and so it will require a person to perform eleven respirations in the warmer atmosphere for ten in the colder, to transmit the same quantity

through the lungs; and this will require two or three more inspirations in the course of a minute. Whenever we add to this the additional vapour which is contained in a warm atmosphere, which is ordinarily about 1-60th of the whole volume, we can easily perceive to how much labour the lungs are subjected, in a warm climate, in order to appropriate the same quantity of vivifying principle as they more easily do in a colder. We may say, that the inhabitant of an elevated region, from the necessary rarefaction of the air, will also be subjected to a similar disproportion of oxygen in the air which he inspires. True, the air at three miles of altitude, has only 15 inches or half the density which it has at the level of the sea; but then it is cooler and freer from latent vapour. It is also purer, which, combined with the condensation from cold, gives the mountaineer a quick but ample respiration, increases the circulation of the blood, and heightens his colour; but from a less pressure in the atmospheric column, he is more subject to hæmoptysis and inflammations of the chest, than the inhabitant of the plains.

Liebig has rather too absolutely stated the effect of diminished atmospherical pressure, if applied to residence in elevated situations, when he says that the quantity of oxygen inspired, and of carbonic acid expired, must vary with the height of the barometer. As a general law, we agree with him, that we expire more carbon in cold weather, and when the barometer is high, than we do in warm weather; and we consume more or less carbon in our food in the same proportion; thus, in Sweden, more than in Sicily; and in our more temperate climate, an eighth more in winter than in summer. We must also recollect that the barometer will often stand as high in warm weather as in cold, and though there is diminished pressure in elevated situations, yet there is a condensation corresponding to the reduction of temperature, and in many instances a less impregnation of vapour, which will considerably modify any deductions drawn from mere difference of temperature. In following this illustrious chemist, we should be led to consider climate as entirely having a relation to temperature, and this as affecting the consumption of carbon in the lungs; for, he says, "in different climates the quantity of oxygen introduced into the system of respiration varies according to the temperature of the external air; the quantity of inspired oxygen increases with the loss of heat by external cooling, and the carbon or hydrogen necessary to combine with this oxygen, must be increased in the same ratio." Thus the Samoyedes and the Esquimaux are compelled to consume food, as oil and blubber, which contains a great proportion of carbon, in order to meet the greater demand for combustion within their lungs from the increased inhalation of oxygen. For the same reason the Neapolitan, and more so the West-Indian and the Hindoo, take less of this carbonaceous food, because they ordinarily inspire less

oxygen, which is the supporter of the combustion of carbon. From our countrymen eating as much food, especially of a fibrinous and glutinous nature, in tropical countries, as they have been in the habit of doing at home, their systems get overcharged with unconsumed carbon; hence too much bile is secreted, and it is thrown upon the intestines more profusely, and so gives rise to bilious fluxes and dysenteries. On the other hand, those whose digestive organs are weak, and cannot assimilate much carbon, are benefitted by removing to an atmosphere where the supply of oxygen at each inspiration is less, and more on a par with the carbon that is assimilated by the impaired state of the digestive organs. For the same reason, where the lungs are curtailed in their functions, as from phthisical tubercles, a removal from a cold climate, where the force of oxidation is too great, to a warmer climate, where it is less, is commendable, and often found beneficial. On the same principle, in our own climate, pulmonic diseases prevail more in winter, when the supply of oxygen is at the yearly maximum; and hepatic diseases in summer and autumn, when the supply is at the minimum, while the supply of carbon is not proportionably diminished.

From what we have stated, it is seen that many elementary conditions of the atmosphere, viz., latitude, longitude, and geographical elevation, are necessary to be considered to form an estimate of climate, as it affects the animal body. We moreover find, that in addition to the general effects, there are often local conditions that give a greater development to some injurious effects on the human body, in one place more than another; such as the production of agues in marshy districts, of goitres and cretinism in some mountainous regions, of dysenteries and liver complaints in various tropical plains, and of fatal pestilential fevers in other localities, not to forget the familiar evils of scrofula phthisis, and ricketts, in our changeable climate. It appears, also, that any frigid climate develops tubercles in the Malay, and very often in the Negro; while we are told that the marshy plains of Demerara and Surinam, though inimical to the Anglo-Saxon race in producing many fatal complaints, are both preventive and curative of phthisis; so also the fens in Cambridgeshire. There is indeed some reason for believing that the climatorial causes of ague and of pulmonary consumption are antagonist powers, and do not prevail together in the same localities.

The statistical information which is now obtaining from many quarters of the world on the subject if medical topography, is of the greatest importance in directing the migration of invalids, the route of expeditions, and the establishment of new settlements and colonies. If more attention had been paid to this subject, this country would not have had to deplore the fate of many of our military enter

prises, and the loss of many of her sons on the shores of pestilential countries.

In practically studying climate, a due consideration must be given to the telluric, as well as to the meteoric character of the country or locality, and even the geological structure must not be overlooked. A subsoil of clay or lias will produce a greater humidity in the incumbent atmosphere, than one of limestone, chalk, or sand, which are more porous, and permit the more ready absorption of rain or surface-water, thereby tending to keep the point of saturation of the air at a greater difference from the temperature. Hilly ranges of sand or chalk, from absorbing less of the solar heat, render the air generally warmer than those composed of marl, clay, or schistose strata, which, being better conductors of heat, absorb more, and keep the incumbent air at a lower temperature, while the water being more retained on the surface, is more subject to evaporation. Chalk hills are observed to be less affected with thunder storms than other rocks. In some volcanic countries, as in parts of Italy and the Ionian Islands, the local climates are much influenced by telluric emanations, issuing either perceptibly or by unperceived exhalations, through the surface. These deleterious gases have been detected to be either carbonic acid gas, azote, or the sulphuretted hydrogen, and in several of the pestilential shores and bays of Africa, the latter named gas has been alleged to be the morbid agent in the production of those fatal endemic fevers which create such devastation among Europeans. This gas in these tropical regions does not issue from the earth, but is generated on the surface from the decomposition of the sulphates in sea water, arising from the putrescence or oxidation of vegetable matter exposed to the hot rays of a tropical sun.

You are aware, that a very scientific attempt has been made to prevent if not to destroy the deleteriousness of this malarious atmosphere, by Professor Daniel, by diffusing around ships visiting these spots, and around dwellings situated within its influence, the vapours of chlorine. This gaseous element, from its great affinity to hydrogen, readily decomposes the sulphuretted hydrogen, and so it was fairly thought that a proper diffusion of it would rob these pestilential places of all their fatal poison. The late lamented expedition to the Niger was accordingly amply provided with apparatus for this purpose; but alas, the hidden monster could not be evoked, and science was confuted by the numerous deaths that resulted in that expedition.

Dr. William, surgeon of the *Albert*, could detect no sulphuretted hydrogen in the river Niger.

There is perhaps no incidental circumstance that influences local climate more than the direction of the winds, and whether they generally blow from the land or from the sea, or whether over hills or extensive plains before reaching the spots in

question? And again, whether the hills are to the north or south of the place?—and whether the sea lies to the east, west, north, or to the southward? The solving of the healthiness, comfort, or otherwise, of any topical climate will depend very much on the existence of one or more of these circumstances, and this can only be determined by having a special instance before us. One wind, as to its azimuth direction, may be healthy in one country or place, while it may be the contrary in others; and the sea or a lake being situated to the north or south may make a very marked difference in the climate of any place. As the consideration of these more restricted views of climate leads to the subject of special hygiene, we will reserve its farther notice to next lecture.

CASE OF STRANGULATED FEMORAL HERNIA, ENDING IN MORTIFICATION OF THE INTESTINE. RECOVERY OF THE PATIENT.

By RICHARD CHAPMAN, M.R.C.S., Kirby Moorside, Yorkshire.

June 3rd, 1833. At five o'clock p.m., I visited Mrs. Petch, of Rosedale, a widow, aged 67, and found her labouring under symptoms of strangulated femoral hernia on the right side, in which state she had been during the last thirty-three hours. At the time, she complained of severe pain in the tumour, which was about the size of an orange, with sickness, vomiting, thirst, and furred tongue; pulse regular and nearly natural, and not much fever. She is of good constitution, and has had a tumour in that situation upwards of thirty years, which for the last ten or twelve has been irreducible, and the present strangulation is probably caused by a cough which she had for a few days. I tried the taxis in the manner recommended for femoral hernia, by first pressing down the tumour, which appeared to be reflected over Poupart's ligament, with one hand, whilst, with the fingers of the other, I endeavoured to return that part of it which was nearest the crural ring, but failed in the attempt. Bleeding to syncope (18 ounces) was immediately had recourse to, and the taxis again tried with no better effect. At a quarter past ten, the one half of a pint of the infusion of tobacco was injected, without producing any effect; in half an hour afterwards the remainder was injected, which was shortly followed by sickness, cold sweats, and almost imperceptible pulse; she remained in this state almost half an hour; and after the effect was gone off, the swelling became somewhat easier.

4th. At 7 a.m., I visited Mrs. Petch again, and finding it impossible to reduce the hernia by a gentle trial of the taxis, and other means having failed, I determined upon having recourse to the operation, in which I was assisted by Mr. Daniel Barker, my nephew, at that time my assistant. She was placed upon a table in a good light, the head and shoulders elevated with pillows, the legs hanging over the end of the table. I commenced the operation by making an incision over the middle of the tumour, beginning at its upper part, and carrying it downwards in a direction pointing from the navel to nearly the bottom of it, which constituted the leg of the inverted